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NOT ENOUGH DOCKS AT NEW YORK.

The grave question of inadequate docking facilities at the port of New York, and especially on Manhattan Island, is again receiving the attention of mercantile interests. Although the department of docks contends that its hands are tied, in that there is no more space on the waterfront available for wharf room, the merchants directly interested are of the opinion that something drastic will have to be done by the municipal authorities to relieve the situation at once.

There are at present only two public docks along the Manhattan waterfront. These are at piers No. 11 and No. 33, East River. The former is a covered wharf and the latter an open one. This means that these two wharves are the only ones along the many miles of waterfront at which vessels arriving at irregular intervals and whose agents do not rent or own a pier can dock. As it sometimes is necessary to give 48 hours' notice to obtain the docking privilege, not only are the steamship agents but also the importers put to unnecessary expense and inconvenience.

In speaking of the situation on Saturday a member of the dock department said the commissioner was unable to do anything at present to relieve the situation.

"As long as the city uses valuable space along the waterfront for parks, we cannot enlarge the docking space. We have applications here every day for docking space which we are unable to grant. About the only land available on Manhattan is along Riverside drive and as that section is under the control of the park department we are not able to put up any docks there. A considerable line of docks is being built at Thirty-sixth street, South Brooklyn, and these, when they are completed about a year from now, may relieve the congestion to some extent. In the meantime the department's hands are tied."

For the last six months the vessels of William H. Tweddell & Co., which ply between New York and China, Japan and the Straits Settlements, have been obliged to unload their valuable cargoes of spices and other East India goods on Staten Island instead of in Manhattan or Brooklyn, as was formerly the case. In view of the heavy hauling expenses from Staten Island to Manhattan, the expense to importers and brokers is considerable, as there is not much profit to the merchants handling far eastern merchandise, this profit sometimes not amounting to more than 1 per cent, while seldom reaching more than 2½ per cent.

That some definite action on the part of the importers, receivers and buyers of Straits produce will be taken in regard to the landing of merchandise on Staten Island is made evident by the flood of protests which are being received daily, even from interior points. The American Spice Trade Association of No. 126 Front street particularly is interested in the situation and has appointed John Clarke of John Clarke & Co. to investigate the matter and see what can be done. The firms of Farrington & Whitney, spice grinders of 376 Greenwich street, and J. Wasserman & Co., the latter large importers from China, Japan and the East, are also being incommoded and put to extra expense by the existing order of things in the dock department and are joining in the movement which has been inaugurated for obtaining improved facilities.

Capt. John Hutton, master of the wooden steamer W. H. Wolff, has purchased the tug D. N. Runnels from the Great Lakes Towing Co. The Runnels has been laid up at Duluth for the past two years.

FRENCH GOVERNMENT AND SUBSIDES.

The French government has just recently laid a bill before the Chamber of Deputies for its ratification in which is embodied an agreement with the Messageries Maritime, the principal and for a long time the most prosperous French steam navigation company. Its dividends, which once ranged from 50 francs to 60 francs per share of 500 francs, gradually dwindled down to 20 francs in 1901, and in the following year to zero.

The company was then reorganized by writing off one-half the share capital of 60 million francs and the creation of preference shares for a sum of 15,000,000. The adverse situation of the company was due to competition, high wages, dear coal and the unremunerative rates to which the subventions for mail services were reduced. A kind of association between the state and the company is proposed by the bill. The services of the company will be divided into two groups, one for the subsidized postal lines on the Mediterranean, to the Far East, Madagascar, Australia and the Atlantic; the other, the free commercial line, not receiving a subvention. The subsidies for the former group will not be at a fixed rate for the whole of the new period of 25 years, but may be revised according to the results that may be produced. After payment of a dividend for the mail lines the government will take a share of the profits. It will also excercise a control over the operations of the company. On the other hand, the government will guarantee new capital that will be raised to build steamers of modern types, to be employed in the mail services, by which greater speed may be obtained as the new ships are added to the fleet or substituted for obsolete vessels. Under certain conditions, the nature of which will only be known

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when the text of the bill is published, the state would have an eventual right to a share of the profits earned by the cargo ships. The government counts on realizing an annual economy of a million francs in the subventions, besides a prospective share of the profits earned under the convention.

AN EDUCATIONAL CAMPAIGN.

Taking their cue from the national policy, advocated by President Roosevelt and endorsed, without qualification, by President-elect Taft, of carrying forward as rapidly as possible, the development of a general system of inland deep waterways throughout the United States, the business men of Grand Rapids, Grand Haven, Bay City and Saginaw, and of intermediate central Michigan points, have organized what is called the Grand-Saginaw Valleys Deep Waterway Association.

The present sole purpose of this association is to carry forward a systematic and thorough campaign of investigation which shall reveal the engineering features and the commercial possibilities of a 21-ft. waterway from Lake Michigan to Saginaw Bay, by way of the valleys of the Grand, the Maple, the Shiawassee and the Saginaw rivers. Securing the desired facts, they will be put before the people of Michigan with a view to developing an intelligent public opinion on the subject.

The facts in the case which are already known, are that the route proposed has its summit in the southeast corner of Gratiot county, and it occurs between the Maple and the Shiawassee rivers; said summit being but 82 ft. above lake levels at Grand Rapids and at Saginaw, and that there is an abundant water supply at the summit, to serve the upper locks. The valleys of the streams named constitute a natural channel whose contour lines show an average elevation on either bank of 75 ft. over the entire distance. According to the surface geology maps of the Michigan state geological survey, this route constituted the glacial outlet for the waters of Lakes Huron and Superior, to the "Chicago Outlet" and to the Gulf of Mexico.

It is also known, by boring tests, that there is a deposit of at least 50,000,000 tons of high grade coking coal in Gratiot, Shiawassee and Saginaw counties and millions of tons of salt, now not available because of the lack of cheap power and cheap transportation. In the vicinity of Ionia are very large deposits of red sand stone and in the limits of the city of Grand Rapids occur the largest and finest deposits of gypsum in the country.

Such engineers as Lyman E. Cooley and the late George Y. Wisner, have declared that the construction of a 21-ft. waterway along the proposed route is absolutely without an engineering problem, and Mr. Cooley has added that "it is the most available route through Michigan with the largest possibilities, and is perfectly located to serve as the trunk line canal for numerous laterals."

The proposed route traverses seven counties which have an aggregate population of 42,000, of which 240,000 are residents of the 25 cities and villages located thereon, and each one of which has substantial and thriving industrial and commercial interests.

HILL LANDS SHOW MORE ORE THAN ESTIMATED.

In speaking for publication on the Great Northern ore lease to the United States Steel Corporation, James J. Hill said last week that up to the end of the present fiscal year of the ore trust, Dec. 7, 1908, the Steel Corporation will have paid in about $2,000,000 since the lease was made. To be exact, the amount figures out $1,963,500, counting a minimum of 750,000 tons for 1907 at 85 cents royalty and a minimum of 1,500 000 tons at 88.4 cents royalty for 1908. "But the Steel Corporation," adds Mr. Hill, "has not taken a ton of ore out of the lands leased to it. It has been engaged exclusively in exploration work, drilling and stripping the surface above the ore bodies, and in making arrangements for rapid economical mining. The ore lies as a rule from 60 to more than 100 ft. under the surface. In this exploration work it has expended approximately $4,000,000, so that by the end of the year the company will have paid about $6,000,000 without extracting a ton of ore. The exploration work showed the mines to contain a much greater amount of ore than was estimated at the time of the contract. The estimates then ranged between 500,000,000 and 750,000,000 tons."

JAPANESE ADMIRAL DIES.

Admiral Count Gombel Yamamoto, former minister of the Japanese navy, died at Tokio Oct. 29.

Admiral Yamamoto was born in 1852 and was one of the first to graduate from the Japanese naval academy, completing his course in 1877. He became successively secretary to the minister of the navy, director of a bureau, vice minister of the navy, and finally, in 1898, minister of the navy. He continued to hold that post during the Russo-Japanese war, being made full admiral in 1904. Admiral Yamamoto was always a popular favorite and was at one time talked of as the probable successor of Prime Minister Salonjo.

He made a tour of the European navy yards with a party of Japanese officers last year and came also to the United States on the same errand. Admiral Yamamoto was strongly pro-American and constantly urged upon his fellow countrymen the continuation of friendly relations with this country.

TRIAL OF BATTLESHIP INVINCIBLE.

The British battleship Invincible, the latest addition to the British navy, in a trial recently under seven-tenths of her power maintained a speed of 25 knots an hour. It is believed that the new vessel when working under full power will reach a speed of nearly 30 knots. The Invincible is a sister ship of the Indomitable which recently made a phenomenal run across the Atlantic with the Prince of Wales aboard. The Invincible's displacement as given in the navy list is 17,251 tons, but with the sinkage to deep load displacement due to maximum coal and storage supply, she has something like 21,000 tons. Her length at the water line is 530 ft., her beam is 17 ft. 6 in., draught about 26 ft.

She carries eight .50-caliber 12-in. guns mounted in pairs in barbette turrets. One turret is forward, another abaft, and the other two amidships, placed in echelon. With this arrangement they can all be fired on either broadside, or broad on the bow or quarter, and six of them directly ahead or astern. Other guns are 16 4-in. guns of the new model for anti-torpedo boat work. The machinery consists of Babcock & Wilcox water tube boilers designed for 41,000 H. P., with Parsons turbines.

It is understood that the Invircible on her full power trial steamed 28 knots an hour over a period of eight hours. This would practically make her 10 knots faster than any battleship in the American navy.

The contract for the structural steel for the light and fog signal station to be built at White Shoal, Lake Michigan, has been awarded to the Milwaukee Bridge & Iron Co., Milwaukee. The cast metal will be furnished by the Atlantic Machine Co., of Atlanta, Ga.

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BRITISH MARINE ENGINE CONSOLIDATION.

The Liverpool *Journal of Commerce* of Oct. 24, says: "We are in a position to state, with official confirmation, that the whole of the marine engine works of the northeast coast are on the eve of jointly signing a working agreement in the form of an amalgamation representing firms valued at a total of £5,000,000. The scheme includes practically all the marine engine firms carrying on business on the Tyne, Wearside, Tees and at Hartlepool. It is expected that the signatures will be all completed within the next week. Negotiations have been proceeding for eight months. The basis of the scheme is economy in production, by concentration of management, classification and standardization of work so as to get the maximum amount of production from the different classes of machinery. There will also be a scheme of proportionate pooling of profits."

BATTLESHIP BIDS.

The New York Ship Building Co. of Camden, N. J., was the lowest bidder for constructing the battleship Utah, bids for which were opened at the navy department this week. Their proposition is for a 20¾-knot vessel at $3,946,000. The Newport News Ship Building & Dry Dock Co. was the lowest bidder for installing machinery in the battleship Florida, being built by the government at Brooklyn, their bid being $3.517,000, guaranteeing a vessel of 20¾-knot speed.

For building a 21-knot ship the Fore River Ship Building Co. underbid William Cramp & Sons, the former figure being $4,440,000 and the latter $4,450,000.

The Utah is to be a ship of about 21,825 tons trial displacement, and is to be a sister ship of the Florida. Both vessels were authorized at the last session of congress. No decision has yet been reached as to the character of engines to be installed aboard the vessel and bidders are given the privilege of submitting proposals for turbine and reciprocating engines.

FURNESS SCHEME ADOPTED.

The trades unions employed in the Furness, Withy & Co. ship building and engineering plant at Hartlepool, Eng., voted Nov. 4 in the ratio of 10 to 1 for the acceptance of the proposition of Sir Christopher Furness that they give a year's trial to his plan of profit sharing.

The thousands of employes in the Hartlepool plant will buy stock in the concern immediately, on which they will receive a 4 per cent dividend, whether the company has a surplus at the end of the year or not. The stock will be paid for by a 5 per cent reduction in wages until the indebtedness is cleared.

The venture is the largest profit-sharing scheme ever attempted. In the agreement between Sir Christopher and the unions a pledge by the men against future strikes is exacted. All disputes and differences will be left to a works council, composed of an equal number of officials and workmen.

Sir Christopher Furness, head of the great ship building firm of the Hartlepools, as already reported, in consequence of losses due to strikes and labor disputes, proposed that the trades unions should buy up the concern. This offer was not accepted, but an agreement has been reached as stated above upon a profit-sharing scheme.

DES PLAINES WATERWAY ENDORSED.

A referendum proposal for the issuance of $20,000,000 of bonds to improve the Des Plaines river is believed to have been given the support of a majority of voters in Illinois in the recent election. The project includes the development of the stream both for power and deep waterway purposes and if the result of the vote proves to be favorable it is expected that Illinois will be reaping the benefit of the water power within three years. The national government is expected to assist in the waterways development especially with regard to the navigational feature of the project.

GATHERING OF GOVERNMENT STATISTICS.

It is reported that the internal departmental statistical committee's attention will be drawn to a discrepancy that now exists between the statistics of lives lost on American vessels as kept by the life saving service and the steamboat inspection service. There is no reason why both of these branches of the government should keep the statistics. One is sufficient. It is important, however, that they should be reliably kept. The gathering of statistics is an irksome job and it is no small task to make them accurate. For instance, the life saving service in its report for 1907 shows that 178 lives were lost in the Larchmont disaster while the steamboat inspection service reports 133. The life saving service reports 45 lives lost in the Dix disaster and the steamboat inspection service 42. The life saving service reports 24 in the Marion, 9 in the Arcadia, 9 in the W. T. Scoville and 21 in the St. Lucie, whereas for these disasters the steamboat inspection service reports 12, 11, 10 and 0 respectively. In both reports the St. Lucie is erroneously reported, two lives having been lost.

ITEMS OF GENERAL INTEREST.

The steamboat Majestic, plying between Newark, N. J., and Coney Island, was unable to navigate the Passaic river recently in a dense fog and was obliged to lay to all night with 1,000 passengers aboard.

A recent fire which broke out in a ferry house at East Twenty-third street, New York, did $4,000 worth of damage and blocked traffic for several hours. Six ferry boats were forced to suspend operation.

Brunswick, Ga., has recently become the South Atlantic port of the Houston line of steamers, thus being assured of monthly or semi-monthly sailings, regularly, and more if traffic can be found to warrant it. The first steamer is expected within two weeks.

The Oil City Boiler Works, Oil City, Pa., manufacturers of marine boilers, is about to begin the erection of a large addition to its plant consisting of a brick boiler shop 180 ft. by 355 ft. of steel construction and concrete foundations.

The Isthmian Canal Commission is soon to ask for bids for furnishing one towing machine for the tug Scully, two towing machines for the tugs Mariner and Porto Bello, seven towing machines for barges and two towing machines for the tugs Bohio and Gatun. The machines are to be delivered on the Isthmus by April 1, 1909.

The council of the city of Tacoma, Wash., recently passed a "rat ordinance" which in substance provides that all ships lying in port must provide themselves with rat guards for preventing rats from boarding or leaving ships moored to wharves. The object is to prevent the spread of bubonic plague.

The schooner A. C. Maxwell, which is owned by W. E. Donelly, of Saginaw, was sunk in St. Mary's river by the steamer R. W. England last week. The accident, it is said, was caused by the fouling of the England's wheel chains.

The new central power plant which is being erected at the Puget Sound naval station is progressing rapidly, one of the two 175-ft. stacks having reached a height of 100 ft. The concrete foundation is practically finished and the two oil tanks, which are to constitute supply reservoirs for the fuel

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consumed at the plant, are finished with the exception of the coverings. These tanks have a capacity of 3,000 barrels each. One of the 450-H. P. water tube boilers has been put in place and two other such boilers have been contracted for. The Westinghouse Electrical Co., of Pittsburg, has been awarded contract for supplying a 1,000 kilowatt and also a 500 kilowatt generator, which with the 500 kilowatt generator previously contracted for will give the plant a capacity of 2,000. All is now in readiness for the erection of the steel frame of the building.

The Mexican government is about to begin the improvement of the jetties at the harbor of Tampico by extending them out into the Gulf, thereby lengthening and deepening the channel and increasing facilities for the easy and safe entrance of the largest ocean vessels. Permanent lights are also to be provided.

The month-to-month agreements in the Italian steamship trade are still continued and no final settlement of the difficulties has as yet been reached, although a conference was held at Berlin so late as Oct. 21. The agreement formulated there covers eastbound business only and the rates are $30 for the fast steamers, $27 for medium speed steamers and $25 for the slow boats.

A new German cable company with a capital of 4,000,000 marks has recently been organized to be known as the German-South American Telegraph Co., which has taken over a concession granted to the electrical manufacturing firm of Felton, Giulleaume & Lahmeyer, for laying a cable to Brazil. Negotiations are now in progress with the Brazilian government preparatory to beginning work.

The first mail to arrive from England since the inauguration of the two-cent postage rate between that country and the United States came in on the Lusitania Oct. 8. It was not the first mail to leave that country under the new regulation, however, for the Kaiserin Auguste Victoria took the first consignment, arriving in New York later than the Lusitania. The latter's consignment consisted of 1,628 bags.

A serious question has arisen in the navy department and is being discussed with animation in the board on construction, involving the amount of the work which will be done at the Brooklyn navy yard on the new battleship Florida. The point has been raised that the machinery for the vessel should be constructed under contract. The proposition is opposed by some of the advisers of the secretary of the navy, who believe that under the law the battleship in its entirety—hull, machinery, fittings and all—should be built by the government at a naval plant. It is maintained, on the other hand, that the machinery may, under the phraseology of the law, be constructed at a private plant under contract, and accordingly the navy department has invited bids, not only for the construction of the machinery of the Florida, but also for the installation of that equipment on the ship at Brooklyn when it is sufficiently far advanced to receive the motive power.

As compared with the stock kept by Great Britain, Germany and Japan, the United States is far behind in the matter of torpedoes. It is said that there are now only 500 Whitehead torpedoes on hand, while England has 10,000, Germany 4,000 and Japan 4,000 in storage. The Whitehead torpedo is to be manufactured at the naval torpedo station at Newport when it is started about Jan. 1, after which it is probable that this shortage will be reduced.

The iron bark Star of Bengal, owned by the Alaska Packers' Association of San Francisco, Cal., went ashore on Coronation Island, off the Alaskan coast, and will prove a total loss. The bark had 136 men aboard, of which 100 were Japanese and Chinese, of which number only 26 were saved, the remainder, including nine whites, were drowned.

The return of prosperity and the consequent return of many workmen to the reopened industrial plants during the last few weeks has resulted in a marked decrease in the number of enlistments for the navy. July's record was a banner one for time of peace but in August and September there was a marked falling off. The navy department is issuing a revised edition of the booklet, "The Making of a Man-o'-Warsman," which is intended to encourage possible applicants.

The Asaka Shosen Kaisha, the second largest Japanese steamship company, is to start a semi-monthly service to the United States, beginning with six vessels. Tacoma and Seattle are to be the ports entered in this country and the eastern terminus will be at Hong Kong. This company has previously confined itself to coasting trade and to services to neighboring Oriental countries.

The twin screw steamship Berlin, built for the North German Lloyd line, was successfully launched at Bremen, Nov. 7. She is one of the greatest passenger and cargo carrying steamships afloat although not possessed of the speed of some of the same line's express steamers. The Berlin is capable of accommodating 3,230 passengers and will carry a crew of 400 men. She has a displacement of 28,000 tons and capacity for 14,000 tons of cargo. Her dimensions are: Length, 612 ft. 3 in.; beam, 69 ft. 8 in.; depth to lower promenade deck, 50 ft. 3 in., and draught, 31 ft. 8 in. The Berlin is equipped with two quadruple-expansion engines of 14,000 H. P. and the contract provides that the vessel shall be able to make at least 17 knots. She is to ply in the Mediterranean service.

The Clyde Steamship Co. recently gave a luncheon to shipping and newspaper men of New York on board its new steamer Mohawk. The Mohawk is the flagship of the company's fleet and is the largest and most complete of its passenger and freight steamers. The Mohawk is to ply between New York and Charleston and Jacksonville. She is 400 ft. long, 48 ft. beam, registers 5,000 tons and has a speed around 14 knots.

The board of general appraisers of the port of New York recently overruled a protest filed by Mattoon & Co., of San Francisco, Cal., it being held that boards or planks known as "iron bark" or "island teak" woods are dutiable at the rate of $2 per 1,000 ft., board measure. The importers asserted that the timber should have been admitted to free entry under the provision in the tariff for "ship timber" or "ship planking."

The president of the republic of Chile has recently signed a decree by which he appoints Morrison & Co., a well-known firm of importers and engineers in Valparaiso, sole suppliers to the Chilean navy for a period of five years. The contract covers practically every item of supplies of all kinds. It is stated that Morrison & Co. intend to give American manufacturers every opportunity to figure on all requirements for this contract.

An official report filed with the navy department states that the navy yard at Mare Island need not be abandoned, but that it will cost about $20,000 a year to maintain a required depth of channel forming the approach to the yard after proposed improvements are made. The advantages of keeping Mare Island and developing the plant are, according to the report submitted, many, and outweigh the advantages of other locations.

Rear-Admiral N. E. Mason, chief of ordnance, will renew his recommendation of last year in behalf of a special fund amounting to about $200,-

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000, to be disbursed by his department for the purposes of experiment. This department has never possessed the means of conducting trials which are held to be necessary to settle all sorts of technical questions and Rear-Admiral Mason has prepared a list of some of these problems which will be made the basis of an appeal to the naval committees for an allotment. These questions include the investigation of behavior of smokeless powder, the search for an alloy which will resist the erosion of guns, the development of the new forms of projectiles, and the effect of high explosives and other ammunition at long range.

The former lake steamer Minnie E. Kelton, which was sold to the Tillamook Navigation Co., of San Francisco, Cal., last year, and which was later wrecked at Astoria, Ore., has been sold by competitive bidding at a figure satisfactory to the underwriters and the owners. The sale includes her cargo of lumber. No official announcement has been made but it is reported that Henry Hewitt, a Portland, Ore., insurance man, is the highest bidder.

Apparently Secretary Metcalf of the navy department will shortly make important recommendations to the president concerning the future of the navy yard at Mare Island. The recommendations refer to the improvement of the approaches to Mare Island and to the strait itself. The estimated cost of this improvement is $1,700,000.

The new steamship Duca di Genova of the Florio Rubattino line was at New York last week on her maiden voyage. The Genova is the fourth of her type to be built by this line. She is a two-funnel twin screw steamer with two sets of quadruple-expansion engines and on her trial trip she made sixteen knots. The Duca di Genova is fitted with all modern appliances and has accommodations for 80 first-class, 16 second-class and 1,740 steerage passengers. She is 450 ft. long, 51 ft. beam, 22 ft. depth of hold and registers 7,798 gross and 4,114 net tons.

The new direct steamship service to Brazilian ports was inaugurated by Norton & Son this week, with the sailing of the Newton Hall from the Bush Terminals in Brooklyn. It is contemplated that the service shall continue at regular intervals in case business demands it. The new venture is causing considerable comment in shipping circles as it was thought that the Brazilian situation had come to a settlement some months ago after the long period of demoralization was ended by an agreement between the Lamport & Holt, Prince and American lines through which a joint service was established. The entrance of the Norton line may precipitate another rate war.

A gasoline fire at the Mare Island navy yard, San Francisco, Cal., Sept. 18, is believed to have resulted in the death of three men. The fire originated on a floating workshop where 30 men were employed. A score of men jumped into the water to escape the flames and all were rescued with the exception of Theodore May, a chief machinist, and two others, who are missing and believed to be drowned. The fire caused a loss of about $20,000. This includes the destruction of some valuable instruments, some damage to the submarine Pike, and the destruction of woodwork aboard the tugs Fortune and Unadilla.

Much apprehension exists among the officials at the New York navy yard regarding the condition of dry dock No. 3. It has reached such a stage that daily inspections are necessary, and while no serious trouble has as yet developed there is much uncertainty concerning it as cavities appear frequently around the structure. One plan has been advanced by which the dock may be repaired without being put out of commission, which would of course greatly facilitate the work at the yard, as otherwise some of the navy yard repair jobs would have to wait or be sent to other yards.

The British Admiralty is reported to be planning to send a fleet of warships around the world in emulation of the successful maneuvers of the American battleship fleet. It is not thought, however, in view of the present political conditions abroad that the admiralty would dispatch a fleet in any way comparable to ours. It has been mentioned as a possibility that the squadron now commanded by Sir Percy Scott, which is at present in South African waters, and which has been ordered to South America, may be brought home by way of the Far East and the Suez canal.

The Newfoundland ministry has agreed to continue for the present season the arrangement effected last year which permitted American herring fishermen to purchase cargoes and get ship's crews at Bay of Islands, Newfoundland. In consequence the British government has canceled the Imperial rescript of 1907 which invested the naval commander in that district with absolute power to prevent the colonial government from interfering with American vessels engaged in the winter herring fisheries along the west coast of Newfoundland. The cancellation of this rescript is said to mean that the colonial authorities will be permitted to prosecute any American who violates the ordinary fisheries regulations, applying alike to residents of Newfoundland and others, but aside from being obliged to comply with the regulations it is understood that the Americans will not be restricted in any way in fishing in Newfoundland waters the coming winter.

The Consolidated Steamship Lines have made arrangements to avoid a foreclosure proceeding against its subsidiary, the Eastern Steamship Co., by agreeing to sell 22,000 shares to a Boston banking house for $1,100,000, which together with the $350,000 cash on hand will give sufficient funds to take care of the floating debt. The Consolidated lines are to retain 6,000 of the shares owned. As the stock could not be turned over to the purchasers until some time after the foreclosure sale of the Consolidated, which is to take place Nov. 25, the Eastern Steamship Co. has borrowed $1,100,000 to settle its floating obligations and thus avoid the foreclosure proceedings.

The much talked of "All Red Route" between England and Australia via Canada has been given further impetus recently by the appointment of Dr. Coulter, Canadian deputy postmaster general, as a special delegate to discuss with the Australian government as to what should be the contribution of the Australian colonies toward the establishment of the proposed service. The Canadians seem to be convinced that there would be an immense saving in time in the delivery of mails as well as of the great strategical value of such a route to Great Britain and her colonies. By thus bringing together the scattered portions of the Empire Canada becomes the central point of all British territory.

The Russian naval budget, as submitted to the Duma on Oct. 6, amounts to $44,067,500, an increase over last year of $616,000. The construction account is $8,155,000, of which only $3,771,000 is for new construction. The decrease in this item is due to the fact that the appropriation for construction of 1908 has not been touched, as no decision regarding the design of new battleships was reached. The present program includes the building of four battleships of 23,000 tons each, five torpedoboat destroyers, to have a speed of 35 knots an hour, and three submarines. The original estimates of the cost of the battleships have been increased by one-third, owing to the greater speed and better armament provided for.

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AFFAIRS AT BUFFALO.

Buffalo, Nov. 10.

Grain receipts of late have gained on last season. The shortage mentioned above took place quite early in the season and then was held pretty steadily for months, then the upturn set in and we are now only 23,000,000 bushels behind last season to date. It appears that the Canadian grain route by water has lost its mid-summer lead entirely, so that there is no doubt that Buffalo will again do the bulk of this business this fall and lay up the usual big fleet of winter cargoes at the end. The long war of the elevator system is closed and pool rates will prevail from this time on, which ought to simplify the situation here very much.

In a strictly local sense Buffalo harbor has made considerable advance this year, and there is need only of the confirmation of the reported Hanna $3,000,000 iron plant to make almost a boom out of it. The new Wickwire pig iron plant down the river is in operation with a big pile of ore to begin on and more to go down there to the end of the season. Everything in that direction is a little previous just now, for though the Niagara ship canal was begun some years ago, vessel men do not look to see it completed inside of four years more or so. With that a fact, the big ore vessels can go to Tonawanda if they choose fully loaded. The limit from the mouth of Buffalo creek down the Niagara river is at present 14½ ft. and as often as the wind is up the lake vessels loaded to that depth have to wait here, several of them being caught by the east wind last week.

What is said to be a very significant water-front move is the purchase of the half-million-bushel Wilkeson elevator by Capt. James J. H. Brown. Everybody knows that Capt. Brown has no particular use for the elevator, so they turn about and say that he is acting as agent for the Lackawanna railroad. After that it is easy to put a few things together and "show" that the road is figuring for a big steel elevator in that vicinity, between Main and Michigan streets on the Buffalo river, and possibly a passenger station besides; the freight station it already has, between Main street and the Commercial Slip, and then, after a slight interval, the uninterrupted possession of the water front to the mouth of the Buffalo river, which means the early removal of the Union elevator and the extension of the water trestle well upstream.

This road is already the shipper of practically half the hard coal from this port by water, and it would be in control of the situation, with these improvements made, much more than ever before. There remains not much after that but the improvement of the upper water of the Buffalo river. This will be accomplished some day, but nobody knows the date thereof, and when it is accomplished there will be another double mile of inner harbor to add to that, provided by the Niagara Ship canal, and the probable further improvements of the shore back of the four-mile breakwater. These improvements are all in a single line. They mean a great port and enough of them are under way to make all of the others very much of a certainty.

JOHN W. CHAMBERLIN.

AN AUSTRALIAN NAVY.

The scheme of the Australian commonwealth for the formation of a flotilla of six torpedo boat destroyers, nine submarines, and two depot ships as the nucleus of an Australian navy has been given the general approval of the British admiralty. The recent visit of the American battleship fleet is believed to have given impetus to the idea of building up a local naval force instead of contributing annually to the maintenance of the imperial forces. It is believed that the parliament will vote readily the $6,250,000 required for the construction of the proposed flotilla. The officers and men, who would number about 1,200, would be provided by the imperial navy, but would be paid by the commonwealth of Australia, which would retain the administrative control of the flotilla.

TRAINING SHIP NEWPORT.

The training ship Newport, of the department of education of the city of New York, is undergoing a refitting during which the 60 undergraduates are enjoying a month's furlough, the new session to begin Nov. 1. At the recent graduating exercises on board the ship, at which 28 boys received diplomas, Richard B. Aldcroft Jr., chairman of the executive committee on the nautical school, made the opening address. Dr. Gustave Straubenmuller, associate city superintendent, presented the prizes, a sextant, first prize to Dwight A. Smith, for general excellence; a binocular, second prize for general excellence, to W. A. J. Kopp; Norie's "Epitome of Navigation," given by Chairman Aldcroft, for excellence in marlinspike seamanship, to Ralph Wood; "Lecky's Wrinkles," given by Mrs. Aldcroft for neatness in appearance, to W. A. J. Kopp, and $10, given by Mrs. Charles Catlin, president of the National Society of United States Daughters of 1812, for greatest efficiency in "heaving the lead," to Robert Williamson. Dwight A. Smith, P. H. Sheridan, and Hobart Ramsey won the prizes given by the alumni society

BATTLESHIP NEW HAMPSHIRE.

It is interesting to note that the new battleship New Hampshire is not the first of that name in the United States navy. *The Army and Navy Journal* says in a recent issue: "The name is not unfamiliar to naval men since 1864, when the name New Hampshire first appears in the navy register. There had been on the stocks at Portsmouth, N. H., from 1818 until 1863, an 84-gun ship of the line named Alabama, with a tonnage of 2,633. There was also a sidewheel steamer named Alabama. It was decided to change the name of the first, so in January, 1864, the sailing ship was launched at Portsmouth under the name of New Hampshire. After doing varied duty as store, depot, receiving and training ship at different places, she was lent to the New York Naval Militia some years ago and was used as the headquarters of the first battalion, being anchored in the East river off Twenty-fourth street. Recently the name was changed to the Granite State and the anchorage was changed to the North river, near Ninety-sixth street. *The Navy Register*, published by Hamersly & Co., in 1901, gives a New Hampshire of 4,150 tons and two guns as having been built in 1801 and assigned to the naval militia of New Hampshire, but we can find no other evidence of such a craft. The first commanding officer of the battleship New Hampshire is, as a writer in the *Boston Transcript* observes, most appropriately, Capt. Cameron McRae Winslow, a descendant of New Hampshire's illustrious Revolutionary soldier, Major Gen. John Stark, the hero of Bennington."

The Heffernan dry dock, which is now located at Quartermaster Harbor, Wash., and which was to have been moved to Seattle some time ago, is likely to stay in its present location for several months at least, as permission to make the proposed move has been denied by the city and United States engineers at Seattle. A suit is now in progress to determine whether any part of the water front where it was proposed to locate the dry dock may lawfully be so used and until that is decided there will be no move. Meanwhile the Tacoma chamber of commerce is making overtures toward having the dry dock left in its present position.

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QUESTIONS FOR MASTERS AND MATES.—NO. 18.

265. When the annual change in the variation is large enough to materially affect the compass on the chart, what is to be done?

266. How would you allow for it if you did not have a new chart?

267. On what line does the compass and chart agree?

268. Describe the course of this line in the lake region.

269. Is an isogonic line a straight line or an irregular line?

270. Is the magnetic meridian of a place a straight line or a curved line?

271. What is the difference between an isogonic line and a magnetic meridian?

272. What kind of variation do we have to the east of the line of no variation on the lakes?

273. How do you know when the variation is either easterly or westerly?

274. Which variation is increasing and why?

275. Is the variation always to be found on the chart?

276. Is a magnetic chart compass of much service on the chart?

277. Do you use them?

278. Explain how you get the variation for your courses. Give an example of it.

279. What variation would you use to the true course between Whitefish Pt. and Eagle Harbor? Would you make one course or two courses of it? Can you make one course of it? What will your correct magnetic course be between those two points?

ANSWERS TO QUESTIONS FOR MASTERS AND MATES—NO. 18.

265. Add or subtract the increase or decrease as required to the variation for that place.

266. Multiply the amount of yearly change by the number of years the chart was published and add or subtract as needed.

267. The line of no variation.

268. Answered in No. 2. Question 28.

269. An irregular line.

270. The magnetic meridian of a place is a straight line. A magnetic meridian is a great circle in whose plane lies the compass needle when unaffected by deviation, but the meridian of a place is approximately a straight line at the place.

271. An isogonic line merely marks or passes through those places having an equal amount of variation, while a magnetic meridian is a straight line from the place of observation to the magnetic pole.

272. Westerly.

273. Take it from the chart.

274. Wly. Because the magnetic pole is moving to the westward around the true pole.

275. Yes.

276. They are too small to be of much service. They answer very well for short courses that are entirely within the scope of the equal Var. printed on the chart compass, but are little or no use for long courses where Var. is different in amount or name.

277. No.

278. Take the amount of the Var. at each end of the course, add them and divide by 2, apply this mean Var. to the course. Eagle Harbor to Devils Island WSW 7/8 W (true) Var. at Devils Island 6 degrees Ely. at Eagle Harbor 2 degrees Ely, total 8 degrees Ely. 2)8(4 degrees of 3/8 pt. Ely. mean Var. Mean C. M. course W x S 1/2 S.

279. True course Whitefish Pt.—Eagle Harbor WNW 1/8 W. Var. at Whitefish Pt. 2 Wly. at Eagle Harbor 2 Ely. As the line of no Var. lies midway along the course I would make one course of it. The true course is also the correct magnetic course.

CANADIAN LIGHTS AND SIGNALS.

All Canadian lights and fog alarms in Lake Superior will be kept in operation this autumn until Dec. 10, with the exception of Caribou island, which may not be kept in operation later than Dec. 5, subject to weather conditions, or early closing of navigation. Mariners must not rely on finding any of these lights in operation later than the dates above specified for closing.

All Canadian lights and fog alarms in Lake Huron, Georgian bay, Lake St. Clair, Lake Erie, Lake Ontario, and connecting waters, will be kept in operation until Dec. 15, excepting Lonely island, Western islands and Red Rock lights, in Georgian bay, which may be closed on Dec. 10 if navigation closes early.

All Canadian lights in the River St. Lawrence will be kept in operation as long as navigation is open, and all gas buoys will be kept at their stations as long as ice conditions admit, and when it is necessary to remove the buoys before the close of navigation spar markers will be laid down where possible.

The American Spiral Pipe Works, Chicago, have just issued circular No. 22, showing some of the varied uses and many advantages and economies of Taylor's spiral riveted pipe and forged steel flanges.

MARE ISLAND STRAIT REPORT.

The report of the board of engineer officers of the United States army and navy concerning the improvement of Mare Island strait gives an estimate of $1,797,000 as the probable cost of the work. This examination was made with a view to deciding the question as to whether it would be more desirable to improve the facilities for entrance to the Mare Island navy yard as well as to enlarge that yard or whether a new site for a navy yard be chosen. The estimate given includes the cost of a self-containing and self-propelling dredge which it would require about $125,000 a year to maintain.

The recommendation provides that the strait be dredged to a 30-ft. depth with a width of 600 ft. over the bar and up to the turn, a width of 400 ft. from the turn to the receiving ship wharf and a width of 1,000 ft. from that point to the north end of the quay wharf; that the dikes within the strait and at the lower end of Mare Island be extended and that the channel in San Pablo bay be dredged to a width of 500 ft. and a depth of 30 ft., all depths being the mean low water.

Instructions to the board of civil engineers referred only to the improvement of the approaches to Mare Island strait from the sea and of the strait itself. They did not include an investigation of the suitability of Mare Island and adjacent waters for navy purposes, nor plans for developments of docks and anchorage facilities.

The extension of the present dike system and the dredging of the channel are recommended, with the explanation that the extended dikes will assist in maintaining the desired depths, together with such additional dredging as may be necessary. The plan provides for the dredging of the basin and proposed channel in the strait to 30 ft. at mean low water, and the extensions of the dikes within the strait, a total distance of 2,400 ft.

The removal of the commission rock to a depth of 20 ft. is recommended by the board; also the addition of a dike at the foot of Mare Island, extending down stream 1½ miles, to prevent filth being carried into the stream, with a proviso that it be further extended should conditions render it advisable. The estimated cost of this improvement is $1,007,000.

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OUR MERCHANT MARINE.

James J. Hill, probably the foremost railroad man in active service, announced recently that his lines had abandoned the marine part of their trade with the orient. To be exact he said:

"Our Pacific trade has been gone for a year. No, the roads do not blame the interstate commerce commission for anything that they have been forced to do. The trans-continental roads withdrew from the Pacific carrying trade because they could not keep this business and get an even break. America today has no flag on the high seas, or might as well not have, for we cannot compete with any other country."

There are only eight ships left flying the American flag on the Pacific ocean. Negotiations have been underway for some time past for the taking over of even these ships. They might as well be taken over as they cannot much longer continue to meet the the unequal conditions imposed upon them. Every country engaged on trans-Pacific commerce aids its merchant marine with the exception of the United States. Japan, which is our most direct competitor, aids its merchant marine most of all. It has not hesitated to appropriate liberal sums of money for the maintenance of its merchant ships; and its program now under consideration is the most liberal of all. In 10 years its merchant marine has grown to imposing proportions from nothing at all.

It has steadily pursued the policy of government supporting the only policy by which it is possible for a new country to build up its merchant marine in the face of the established marine of other countries. The United States, for reasons beyond the common understanding of mankind, has steadily refused to support its merchant marine through subsidies though it has through its tariff policy subsidized most everything else. It is about time for it to wake up.

There is no pride to be taken in the contemplation of American maritime inefficiency. It is enough to make any American ashamed of his country. The real achievements lie elsewhere. Is it not shameful that such splendid specimens of marine architecture as the Lusitania and Mauretania cannot be built in this country. They could be readily if sufficient encouragement were given to shipping. The United States is practically cut off from one of the great developments of the world, from the one industry most prolific in stimulating all other industries. Perhaps some day its statesmen will have sense enough to appreciate the fact.

Attention has again and again been directed to the inadequacy of communication with the southern portion of this hemisphere. If any country is entitled to the trade with South America it is the United States. It has proclaimed a natural protectorate over the southern republics and yet as far as trade goes it gets little or none from them. Writing from Valparaiso recently a prominent American said:

"In the past few weeks men in Chile have suffered great inconvenience by lack of mail connections. On Wednesday, the 15th, mail was received from the United States, but the latest dates of the previous mail were up to May 27, making 49 days without letters. This is a somewhat longer interval than usual, but mail is received in less than six weeks only rarely in a year.

"When it is known that the time actually required between New York and Valparaiso does not exceed 20 days the annoyance can be understood. Between New York and Colon the time is six days and the trip from Panama to Valparaiso can easily be made in 12 days.

"It is frequently said that when the Panama canal is finished the time will be shortened. If this were true it would be preposterous to be compelled to wait seven or eight years to remedy an evil that seriously injures American trade. A better system of communication ought to be established at once.

"And then it is not at all clear that the completion of the canal will bring about the desired change, because the traffic on the Pacific side is in the hands of a trust composed of the two steamship companies, the Pacific Steam Navigation Co. and the Compania Sud-Americana de Vapores, and this trust will hold its position until disturbed by a vigorous competing line.

"Present conditions are caused by the increase of traffic and lack of steamers to handle it. Between Panama and Valparaiso the trip frequently takes from 30 to 35 days, because through steamers stop at more than 20 different ports, picking up and discharging cargo wherever a few tons can be handled. The journey can easily be made in 12 days if properly managed.

"The trade of these countries is almost entirely in the hands of the English and Germans and the English control the lines of steamers. One is an English company and the Chilean company working with it is combined in a sort of trust. Naturally these interests are opposed to anything that would help American trade. They care not how long the American mails are detained, but the same English company makes its

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trips to Liverpool, 10,000 miles distant, three times as far, in about the same time. They care not how much American freight is detained, but freight from Liverpool or Hamburg comes with the regularity of a railroad train.

"Manifestly the only remedy is an American line of steamers down the coast. Every manufacturer in the United States who is interested in extending his trade to this part of South America should urge upon congress such action as will result in the establishment of a fast line of steamers on this coast."

Practically every manufacturing association in the United States has urged congress to make the projection of shipping lines to South America possible. What more support than this does the American congress require? It has been deluged with petitions from business organizations throughout the land. It knows the temper of the people and it is time for it to act.

LAKE FREIGHT SITUATION.

The end of the present week will see a sensible reduction in active tonnage, the Steel Corporation having notified vessel owners that it will not take any outside tonnage during the balance of the season. This means that vessels coming down with ore will either go into winter quarters or make a trip with coal for storage. Whatever ore is carried after this week will be in ships operated by the shippers themselves. It is not likely that there will be much business transacted on an excess insurance rate this year.

The coal movement is hampered by lack of dock space at the head of the lakes, and the total movement will not be as heavy as last year.

The grain rate holds steady at 1½ cents from the head of the lakes to Buffalo with 2 cents for winter storage.

The lumber rate has been advanced to $3.50 but even at that rate lumber boats are scarce.

PIG IRON SITUATION.

Continued activity in the pig iron market, both north and south, is reported, the tendency being toward higher quotations. Many blast furnace interests are not disposed to contract beyond the first quarter of next year. Prices on southern iron are firm and show but little change, but in northern Ohio especially, sharp advances in pig iron have been made. Bar iron manufacturers in the central west have advanced the price $2 a ton, because of the high prices of scrap. Many railroads are preparing to place orders for steel rails, but there is some controversy as to specifications, the Pennsylvania railroad insisting upon the specifications adopted last spring, which the mills decline to accept. Manufacturers of nuts and bolts report improved conditions, and prices advanced 5 per cent. The sheet market is more active and there is less irregularity in quotations. The leading feature of the week has been the activity of the old material market accompanied by an advance in prices. There is some activity in coke and a slight advance in prices for future delivery.

CONTRACT FOR BULK FREIGHTER.

Wm. P. Snyder, of Pittsburg, has given contract to the Great Lakes Engineering Works for a new steamer to be a duplicate of the Thomas F. Cole, of the Pittsburg Steamship Co.'s fleet. This means that she will be 603 ft. long and 58 ft. beam.

CENTER RANGE IN WEST NEEBISH CHANNEL.

Quite a number of lake masters are desirous that the executive committee of the Lake Carriers' Association should should take up with the government the question of center ranges in the new West Neebish Channel. It seems to be the opinion of a number of masters that a center range is imperative at the turning points in the new channel to steady vessels on at night. With nothing to steer her on, the experience has been that the vessel zig zags from one side of the channel to the other. A vessel master who called at the MARINE REVIEW office said:

"The navigation of the West Neebish channel is made extremely difficult at night on account of the manner in which it is lighted. On my last trip down I got into the West Neebish channel about midnight. The second red light was so dim that I could not see it at all. In fact I could see nothing but the two bright lights until I got within a quarter of a mile of the second turning point. The vessel was continually sawing from one side of the channel to the other as the wheelsman had nothing to steady her on. If there is objection to placing center ranges the government should at least place one light on a line with the center of the channel so that the wheelsman would have some mark to indicate when his boat started to swing one way or the other. Moreover, there is a cross current which seems to cause the boat to work constantly to the east side of the channel. A Canadian boat that locked through just ahead of me mistook the second red light for the first and started across the channel on range of it with the result that it fetched up. Precisely the same thing happened to the steamer J. S. Morrow of the Mitchell fleet not long ago. If range lights are tabooed I would suggest that we get something on Sand Island or arrange gas buoys along the channel."

PASSENGER STEAMER LAUNCHED.

The hull of the new steel passenger steamer building for the White Star line of Detroit, was launched yesterday at the yard of the Toledo Ship Building Co., Toledo, O. She was christened Wauketa, after a noted Indian chief, but owing to the recent death of A. A. Parker, president of the steamship company, the ceremony was very informal.

A splendid record has been made on the construction of this vessel by the ship building company, the work having been done in 20 working days of 9 hours each, 26 days having elapsed from the time the material commenced to arrive to the date of the launching.

The Wauketa is 185 ft. long, 37 ft. beam, and 14 ft. depth molded. She is to be fitted with triple-expansion engine of 1,000 H. P., and three boilers. The hull is to be towed to Detroit to receive the boilers, machinery and woodwork.

General Manager B. W. Parker together with some of the officers and stockholders of the company attended the launching.

SAWDOLET CHANGES HANDS.

C. Clemente has disposed of his interest in Sawdolet to Oscar McNab, 509 Schofield building, Cleveland, who will hereafter operate the company under the name of the American Sawdolet Co. Mr. McNab was formerly connected with the Mason Supply Co., dealers in building supplies. Sawdolet as a flooring for ships has met with considerable success on the lakes and has been installed upan a number of the leading lake freighters. It is an excellent flooring, being both fireproof and waterproof and is capable of taking any color desired to harmonize with cabin fittings.

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BATTLESHIPS DELAWARE AND NORTH DAKOTA.

The battleships Delaware and North Dakota were authorized, one by act of Congress approved June 29, 1906, and the other by act of Congress approved March 2, 1907.

LAUNCHING OF THE BATTLESHIP NORTH DAKOTA.

The plans for these ships were prepared by the board of construction in competition with the plans submitted by various naval architects and ship building companies and submitted to a special board under the presidency of the assistant secretary of the navy, in December, 1906, and approved by Congress. Contract plans and specifications in strict conformity with the general plans approved by this special board were completed and the circular signed by the secretary of the navy on April 4, 1907, and bids for the construction of the vessels were opened on June 20, 1907.

The contract for the Delaware was placed with the Newport News Ship Building & Dry Dock Co., Newport News, Va., Aug. 6, 1907, at a price of $3,987.000, to be built in accordance with the department's design for both hull and reciprocating machinery, and the contract for the North Dakota was placed with the Fore River Ship Building Co., Quincy, Mass., Aug. 6, 1907, at a price of $4,377,000, to be similar as regards hull and equipment to the Delaware, but propelling machinery to be Curtis marine turbines, an American design of turbine engine.

The keel of the Delaware was laid Nov. 11, 1907, and that of the North Dakota, Dec. 16, 1907.

The general dimensions and features of each vessel are as follows:

Length on load waterline, 510 ft.; breadth, extreme, at load waterline, 85 ft. 2⅝ in.; displacement on trial not more than 20,000 tons; mean draught to bottom of keel at trial displacement, about 27 ft.; total coal bunker capacity, about 2,500 tons; coal carried on trial, 1,000 tons; feed water carried on trial, 66 tons; speed on trial, 21 knots.

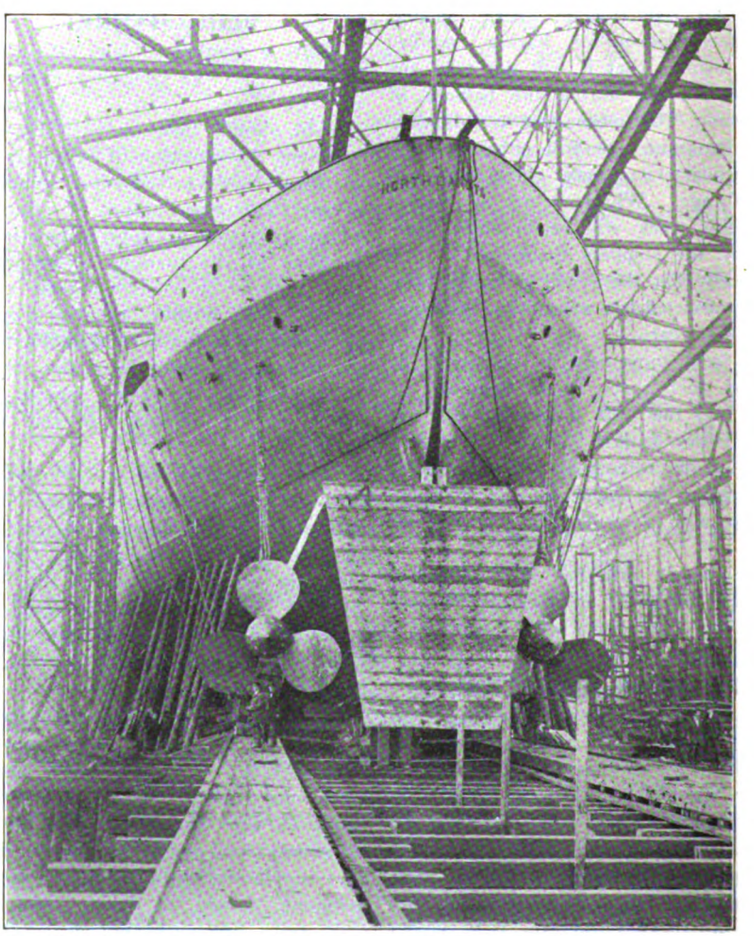
Armament: Main battery, 10 12-in. breech-loading rifles. Secondary battery, 14 8-in. rapid fire guns, four three-pounder saluting guns, four one-pounder semi-automatic guns, two 3-in. field pieces, two machine guns, caliber 0.30. Two submerged torpedo tubes.

BIDS FOR BATTLESHIP UTAH.

Bids were opened at the navy department on Nov. 9 for the construction of battleship No. 31, to be known as the Utah, the contract being awarded to the New York Ship Building Co., Camden, N. J., at a contract price of $3,946,000.

On the same date the department also opened bids for the machinery to be installed on the battleship Florida and for the armor for both the Florida and Utah.

There were three classes of bids for



STERN VIEW OF THE NORTH DAKOTA.

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the construction of the Utah, as follows:

CLASS 1.

Hull and turbine machinery, department's plans and specifications:

William Cramp & Sons, Philadelphia, Pa. $4,330,000
Newport News Ship Building & Dry Dock Co., Newport News..... 4,180,000
New York Ship Building Co., Camden, N. J..... 3,946,000
Speed in each case to be 20¾ knots.

CLASS 2.

Hull and reciprocating machinery, department's plans and specifications:

William Cramp & Sons.....$4,240,000
Newport News Ship Building & Dry Dock Co. 4,150,000
Speed in each case to be 20¾ knots.

CLASS 3.

Hull and equipment of department's design and machinery of bidders' design:

William Cramp & Sons, Cramp-Zoelly machinery $4,450,000
Newport News Ship Building & Dry Dock Co., Parsons turbines..... 4,100,000
Newport News Ship Building & Dry Dock Co., reciprocating engines with Mosher boilers 4,070,000
Fore River Ship Building Co., Quincy, Mass., Curtis turbines..... 4,463,000

The bid of the New York Ship Building Co. specifies that the vessel is to be completed in 32 months.

MACHINERY FOR BATTLESHIP FLORIDA.

There were but two bidders for supplying the machinery for battleship No. 30, which is to be known as the Florida. The Newport News Ship Building & Dry Dock Co., Newport News, Va., in Class 4, department's design, bids $1,715,000 for machinery to give a speed of 20¾ knots. In Class 5, bidder's design, this company bids $1,517,000 for Parsons turbines with Mosher boilers. For reciprocating engines this company bids $1.588,000 and for reciprocating engines with Mosher boilers, $1,542,000. Speed in each case is guaranteed to reach 20¾ knots.

The Fore River Ship Building Co., Quincy, Mass., submitted an informal bid on parts of machinery represented by Curtis turbines, the prices varying with various installations as follows: $395,000, $454,000, $485,000 and $544,000.

BIDS FOR SUPPLYING ARMOR.

	Per Ton —Classes—			
	A	B	C	D
Midvale Steel Co., Philadelphia, Pa.	$420	$405	$462	$512
Carnegie Steel Co., Pittsburg, Pa.	420	415	455	600
Bethlehem Steel Co., Bethlehem, Pa.	420	408	470	508

Deliveries are promised by all bidders at the rate of 600 tons per month after May 9. 1909, the Carnegie Co., however, offering to commence deliveries within six months.

It is believed probable that the bids submitted for furnishing the machinery for the Florida will be rejected by the navy department and the work performed at the navy yards.

ANNUAL REPORT MARINE CORPS.

Major Gen. G. F. Elliott, commandant of the United States Marine Corps, in his annual report, just made public, has stated that there is a necessity for the conversion of a ship of the Dixie or Panther type into a transport for the sole use of the Marine Corps, the ship to be commanded and manned by officers and men of the navy. The coinciding opinion of Lieut.-Col. Eli K. Cole, commanding the recent Panama expeditionary regiment, is quoted and the statement is made that the enlisted men of the Marine Corps have endured more hardships during the last two years on naval vessels used as transports than they would have in an ordinary campaign ashore of the same duration.

The report states that though the status of the commissioned and enlisted personnel will be slightly benefited by the legislation provided for in the last naval appropriation act, sufficient relief has not been granted.

Estimates for the coming fiscal year include these amounts: For the erection of two officers' quarters at Portsmouth, $30.000; for improving the parade ground at Boston navy yard, $10,000; for doing the same at Newport, $8 000; for two officers' quarters at New London, $20,000; for barracks, $150,000; for officers' quarters, $60,000, and for building for men, $20,000, at Philadelphia; for additional barracks, $150,000. and for four additional sets of officers' quarters, $60,000; for sewerage, etc., $25,000, at Norfolk; for one set of officers' quarters, $10,000, at Charleston; for one additional set of officers' quarters, $10,000, and for improving the parade ground, etc., $12,000. at New Orleans; for barracks, $150 000, and for five sets of officers' quarters, $60,000, at Bremerton; for barracks, $135,000, and for five sets of officers' quarters, $60,000, at Honolulu; for officers' quarters, $60,000, and for wharf, $5,000, at Cavite; for three additional sets of officers' quarters, $15,000, at Olangapo, P. I.

NO MARINES ON BOARD BATTLESHIPS.

Following the advice of Admiral Evans and other prominent naval officials, President Roosevelt has promulgated an order separating the Marine Corps from duty on board ships. This action is one of the most significant in the history of the corps and while the order will be obeyed implicitly the officers and men are protesting against it among themselves. It is the belief of the Marine Corps that the navy officers have been more or less envious of the work assigned to the marines and it is with great regret that they come to the parting of the ways, since the history of the corps has been so closely interwoven with that of the navy that the two share the glory of a large number of engagements. The text of the order is as follows:

Executive order defining the duties of the United States Marine Corps:

In accordance with the power vested in me by Section 1619, Revised Statutes of the United States, the following duties are assigned to the United States Marine Corps:

(1) To garrison the different navy yards and naval stations, both within and beyond the continental limits of the United States.

(2) To furnish the first line of the mobile defense of naval bases and naval stations beyond the continental limits of the United States.

(3) To man such naval defenses, and to aid in manning, if necessary, such other defenses as may be erected for the defense of naval bases and naval stations beyond the continental limits of the United States.

(4) To garrison the Isthmian Canal Zone, Panama.

(5) To furnish such garrisons and expeditionary forces for duties beyond the seas as may be necessary in time of peace.

THEODORE ROOSEVELT.

The White House, Nov. 12, 1908.

This action is the culmination of a long fight against the marines by seagoing officers who objected to their presence aboard ship for several reasons, the principal one being that they were no longer needed, as in the days of the impressment of seamen, to prevent rioting among the crews of fighting ships. The work now assigned to the marines is to be done hereafter by seamen. Another objection to the presence of marines on naval vessels is that in time of war when their duty is to man the torpedo defense guns they might be called upon to make up a landing party, thus leaving the torpedo defense guns without the necessary crews. This is what actually happened during the Spanish war off Santiago, when the landing party of marines which went ashore at Guantanamo bay and held the small shore line so valiantly, were taken from Admiral Sampson's fleet.

At present the marine guard of a battleship consists of about sixty officers and men, and the intention is to gradually withdraw these guards from the vessels and substitute for them the same number of bluejackets. It is not the plan of the navy department to deprive the marines of all sea duty. Instead of each vessel of a fleet having a small marine guard, it is proposed that a marine transport with a large force

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of marines and officers shall accompany each fleet so that if necessary for any duty they will be at the command of the commander-in-chief of the fleet with which they are serving. In his annual report Major Gen. George F. Elliott, commanding the Marine Corps, recommended that a special transport be provided for the use of the Marine Corps in expeditionary movements, similar to that to Panama last July. It is proposed by the department that a vessel of this sort be provided for duty with the battleship fleets so that an adequate force of marines will always be available for use in case of emergency.

The marine corps is the oldest branch of the naval service. It was established in 1775 by the continental congress, and two battalions of American marines were then authorized for duty afloat when required. They were the fighting men of the old frigates. In the days when two battling frigates were lashed together, the marines with their pikes bore the brunt of the fighting and composed the boarding parties. The bluejackets in those days sailed the vessels and only aided in fighting. The marine corps has the distinction of being the first to plant the American flag over a foreign fort, which was done at Derne, Tripoli, in 1803. For this conspicuous service the word "Tripoli" was inscribed on their colors.

During the civil war the marines also rendered conspicuous service, and Admiral Farragut said that "the marine guard is one of the greatest essentials of a man-of-war." Shortly after the civil war, in 1866, an attempt was made to transfer the marine corps to the army, but this was defeated. A bill was introduced in congress providing for the abolishment of the marine corps and the transfer of it to the army, but this effort failed. With the development of the long range gun the necessity for the marine aboard ship has been less obvious and his duties have dwindled to those of a routine nature, such as policing, sentry duty, and manning the small guns. It is contended that this work can be as well done by bluejackets, and Rear Admiral Robley D. Evans, former commander-in-chief of the Atlantic battleship fleet, has been one of the principal seagoing officers to recommend the withdrawal of the marines.

Though withdrawal of the marines from sea duty was undoubtedly opposed by officers of the marine corps, Major General Elliott, commandant of marines said: "The president is the head of the army and the navy, and to question or criticise his action would never be done by a brave soldier. The order will be carried out strictly and willingly."

ATLANTIC COAST NOTES.

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

With the arrival at Boston of the Italian steamship Mongibello a new steamship service between that port and ports in the Mediterranean was opened last week. The Mongibello brought a cargo of 1,400 tons, mostly macaroni, and had touched at Messina, Palermo, Naples and Oran en route. If the new venture is a success other vessels will be placed in the service.

Close on 2,600,000 pounds of tea were imported through Boston during the year ending June 30, 1907, and the amount for the fiscal year of 1908 was over 4,000,000 pounds. Owing to the rapid increase of the tea business at this port the government is about to establish the office of examiner, when it is expected the importations will be considerably increased.

The Central Vermont Transportation Co. has been organized at Portland, Me., for the purpose of conducting a steamboat service between New London, Conn., and New York, in connection with the Central Vermont Railroad. The directors of the new company are Charles M. Hayes, general manager of the Grand Trunk Railway; George C. Jones, general manager of the Central Vermont Railroad, and L. L. Hight, counsel for the Grand Trunk Railroad.

Provincetown, Mass., was visited on Sunday by the largest fleet of coasting vessels that has put into the harbor in many years, the vessels having sought shelter in the harbor from a northeast gale that prevailed all day. Nearly all of the vessels had sustained some damage.

The four-masted barge Independent, from Norfolk for Boston, sank on Saturday night off Hog Island, coal laden. The barge was in tow of the tug Edward Luckenbach at the time, and the crew of four men are supposed to have been lost. The accident occurred nine miles from Cape Hatteras and eleven from Hog Island.

The derelict destroyer Seneca, the only vessel of her design and type afloat, is now ready for service. The Seneca is officered and manned by members of the revenue cutter service and will be stationed off Tompkinsville, Staten Island. Her principal field of operation will be an area bounded on the north by a line drawn from Portland to Sable Island, and from Sable Island to Bermuda and Charleston.

The Merritt & Chapman Wrecking Co. has contracted to float the schooner Mary F. Cummins, which stranded on Saturday night near the Indian river lifesaving station while bound from Boston to Lewes, Del., with a cargo of barrels.

The first cargo of chrome ore to arrive in this country for some time from New Caledonia was landed at Philadelphia last week from the Norwegian ship Derwent. The Derwent left New Caledonia on July 17, and had a fair run north.

The Hamburg-American liner Amerika this week brings to New York 1,674 steerage passengers, this number exceeding all records in steerage passengers carried by one vessel this year.

The old New York schoolship St. Mary's has this week been burned for the metal that is in her dismantled hull. Sixty years ago she was one of the fastest and most efficient warships of her size in the world. Last spring she was withdrawn from schoolship service and put up for sale by the government. As junk she brought $5,000.

The Savannah Board of Trade has asked the Merchants' & Miners' Transportation and the Ocean Steamship companies for a lower rate of freight on lumber to northern ports. Savannah is one of the largest yellow pine distributing centers in the south, and shippers say that unless freight charges are reduced the business may be diverted elsewhere.

According to word received at Newport, R. I., the work of floating the gunboat Yankee, stranded off the mouth of Buzzard's bay, is progressing steadily. It is said by the wreckers that with good weather and other favorable conditions the compressed air which is expected to float the vessel may be turned on in about two weeks.

The steamship Empress of Ireland, of the Canadian Pacific Railroad, recently made a record passage between Liverpool and Quebec. The distance was covered in six days, less five minutes.

Following the arrest of two individuals, one of whom is a sailor, at New York, detectives recovered kid

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gloves valued at $5,000 which had been smuggled into the country. One of the prisoners stated that the gloves had been smuggled off the steamship pier in apple barrels, and further said that smuggling had been going on in this manner for several years.

The licenses of Captain Barksdale Macbeth and Second Mate Clinto B. Googins, of the Clyde line steamer Chippewa, have been ordered suspended for 30 days by Supervisors of Steam Vessels Withey and Stewart, after investigating the grounding of the Chippewa at Montauk Point on June 23. The supervisors found that the master and second mate were responsible through negligence.

The British bark Cloch, the first of a fleet, is being docked and given light repairs in the dry dock at Quartermaster Harbor, near Tacoma, Wash.

The steamship Amur, which has been experiencing a series of annoying accidents recently, last Sunday struck a rock at Lokeport, Queen Charlotte Island. Fortunately her speed was slow and she was not seriously damaged.

The steamship Minnewauska, the latest and largest of the fleet of the Alantic Transport Line, was successfully launched at Belfast on Nov. 12. The new vessel is 600 ft. in length, 65 ft. in width and 39 ft. in depth, and is propelled by two sets of quadruple-expansion engines. She will go into service about May 15 of next year.

The White Star freight steamer Armenian, which with the other freight steamers of the line had been out of service nearly a year, arrived in New York last week to take up her old running

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The new armored cruiser Montana, now at the Norfolk navy yard, was last week presented with a solid silver service of 34 pieces by the residents of the state of Montana. The presentation was made by Chief Justice Theodore Brantley, of Montana.

The steamship Philadelphia, of the American line, arrived this week at New York on her fiftieth round trip. During the entire period the vessel has been commanded by Captain A. R. Mills, who was also with her when she was the Harvard—during the Spanish-American war.

PACIFIC COAST NOTES.

Office of the MARINE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Nov. 14.

While leaving Vancouver harbor Sunday morning, Nov. 8, the Canadian Pacific liner Princess Royal struck the Japanese liner Fuki Maru, which was lying at anchor, a severe blow amidships. The cause of the accident is unknown. The damage is estimated at $20,000. The Royal left Vancouver at 9 o'clock for Seattle and five minutes later struck head on against the port side of the Fuki Maru. The Royal's wooden stem was completely smashed in; the forestanchions were entirely torn out and the entire forepeak section of the boat was caved in. Temporary repairs were made at Vancouver and late Sunday afternoon she left for the drydock at Victoria. Permanent repairs will require three weeks. The Japanese steamer was also badly damaged. Five plates were broken by the impact and a number of frames were bent. The Princess Beatrice will substitute for the Princess Royal while the repairs are being made.

Damage to the Japanese steamer Fuki Maru, struck Nov. 8 by the Princess Royal, will amount to $10,000 and bids for the work will be opened in Vancouver in the near future. The Fuki Maru is under charter by Jebsen & Ostrander, Vancouver, who will open the bids. In addition to the damage mentioned above, several deck beams were broken.

The steamship Jefferson, operated between Seattle and southeastern Alaska by the Alaska Steamship Co., is laid up at Seattle undergoing repairs to her condensers.

The Great Northern Steamship Co.'s big liner Minnesota has arrived in Seattle from the far east with a fair cargo. While laying over she is undergoing minor repairs to her machinery, which include renewing and truing the main bearings, replacing some auxiliary piping and other minor replacements.

The Pacific Coast Steamship Co.'s San Francisco liner Umatilla was in the Moran Co.'s drydock Nov. 7 receiving repairs to her propeller, which was badly damaged by backing onto a sand spit at Blaine, Wash., recently.

Suit for damages to the extent of $2,430, said to have been suffered by the schooner F. S. Redfield, due to the opening of seams when the vessel grounded at Marshfield, Ore., July 9, has been begun by the owners of the schooner against the owners of the tug Columbia which had the Redfield in tow at the time. It is alleged that mishandling on the part of the tug caused the Redfield to go aground.

The Merchants' Exchange, San Francisco, has received a dispatch from London stating that the French bark Vendee, bound from Oregon to the United Kingdom, previously aground on Wollaston island has been towed into Punta Arenas with her cargo of 3,000 tons of wheat wet.

For the first time since the navy department has been shipping coal around Cape Horn to the Pacific coast has a cargo arrived in an American steamship. The vessel is the Missourian, 5,077 tons, now unloading at the navy yard, Puget Sound. She sailed from Newport News, Sept. 12, with 10,000 tons of coal and had a good voyage.

The Willamette Iron & Steel Works, Portland, Ore., expects to launch the steel passenger steamer H. B. Kennedy, now building for the Port Orchard Route, Seattle, on Nov. 21. The Kennedy will be christened by Miss Minna Benbennick of Bremerton, Wash.

Sloan Brothers, ship builders, Seattle, announce that the steamer Vashonian now building for the Vashon Steamboat Co., Seattle, will be launched during the first week in December. The Vashonian is a wooden passenger steamer 125 ft. in length, fitted with 700 H. P. engines and will be operated between Seattle and Vashon Island points.

Hall Bros, Marine Railway & Ship Building Co., Winslow, Wash., are repairing the steamer Corwin. The Corwin is noted in Pacific coast shipping circles in always being the first boat of the season to reach Nome, Alaska, and if necessary she is the last one out. She is especially fitted for breaking ice.

The McConnell Engineering & Machinery Co., of Tacoma, Wash., is doing an increasing business in the manufacture of propellers for steamships. All the work of making these large castings is done at this plant. A few weeks ago the company turned out a 7,000-lb. bronze four-bladed wheel for the steamer Whatcom, of Seattle. Mr. Niven McConnell is president and manager of the company.

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THE NEWPORT CONFERENCE.

In the issue of *McClure's Magazine* for January, 1908, was an article by Henry Reuterdahl charging numerous defects with the vessels of the United States navy. Following this came an investigation by a committee of congress. Those proceedings, including all the testimony taken, are public documents. Congress adjourned on May 30 without this committee submitting any report.

The principal supporters of the Reuterdahl charges were Commander W. S. Sims, Commander A. L. Key and Commander F. K. Hill. Commander Key was formerly naval aide to the president, a position which is now held by Commander Sims. Commander Hill at the time covered by the discussion was a member of the general board.

One June 9, 1908, Commander A. L. Key, who had been on duty at the works of the Fore River Ship Building Co., in conneceion with the U. S. scout cruiser Salem which he was to command, submitted to the department a letter containing "comments and suggestions" as to certain main features of the United States battleship North Dakota, also building at the works of that company.

The North Dakota is a battleship designed in accordance with act of congress of June 29, 1906, which provided that the secretary should afford an opportunity to competent naval architects outside of the government to submit plans and specifications for the battleship contemplated in the appropriation, and further provided that the plans and specifications officially selected by the department should be submitted to congress before proposals were issued or bids accepted for construction. The department issued invitations for designs and as a result nine different designs were submitted. These designs were considered together with those prepared in the department by the board on construction. In order to make a selection of what was considered the best of the plans submitted a special board consisting of the assistant secretary as president and Engineer-in-Chief Charles W. Rea, United States navy; Chief Constructor W. L. Capps, United States navy; Rear Admiral N. E. Mason, United States navy; Capt. John P. Merrell, United States navy; Capt. Raymond P. Rodgers, United States navy, and Capt. Richard Wainwright, United States navy, as members was appointed. After full consideration by this board the plans submitted by the board on construction were selected. These are the plans which were sent to congress, and as the building of the North Dakota and Delaware was authorized in accordance with them they had the approval of congress.

On July 2, 1908, the navy department directed that the general board and the Naval War College make a joint report on the subjects referred to in Commander Key's letter and referred the letter to them for that purpose. In addition to the regular members of the general board and the Naval War College, additional officers were ordered to the Naval War College representing the service in general, officers varying in rank from lieutenant up to rear admiral. Shorn of extraneous matter, Commander Key's letter and the findings of the Newport conference with regard to it are given below.

The criticisms contained in the letter may be summarized under the following general heads:

1. Inadequacy of 5-in. casemate armor for the protection of 5-in. torpedo defense guns.
2. Torpedo defense battery not properly placed.
3. Twelve in. guns less powerful than those of foreign nations.
4. Location of No. 3 turret between the engine room and boiler room undesirable and unnecessary.
5. Lower edge of main water line belt too low.
6. Conditions of weights and stability for battle ships not supplied to commanding officers for their information.
7. Ventilators and funnels too high and not properly protected.

These will be taken up in the order given and discussed under the various heads, quoting in all cases from the report of the conference resolutions which bear on the subject.

Inadequacy of 5-In. Casement Armor for the Protection of 5-In. Torpedo Defense Guns.—It will be recognized by anyone that if the 12-in. armor could be fitted for the protection of these guns it would be a desirable thing to have. To give them a protection of 12-in. armor would require a great increase in displacement and cost of the ship or a sacrifice of some other necessary quality which could not be made.

The following resolution was presented before the Newport conference as expressing Commander Key's views on this subject: "Resolved, That whereas 5-in. casemate armor is readily penetrated by heavy projectiles at battle ranges, resulting in the scattering of many fragments of armor which will injure the light guns, the conference considers that these guns on the North Dakota would be in less danger behind no armor than behind 5-in. armor when attacked by 12-in. projectiles."

This subject probably received more thorough and complete discussion—if that may be—than any other one subject discussed by the conference. The resolution was rejected by the overwhelming vote of 52 to 10, showing that after Commander Key and his supporters had had an opportunity to discuss and present their views to the best of their ability his views as expressed in his letter were rejected by a vote of more than 5 to 1. It is interesting in this connection also to consider what the Russians and Japanese are doing as regards the armor for the defense of the torpedo battery, as they, having had most recent experience in actual warfare, can naturally be assumed to be in a position to judge as to the relative amount of protection which should be assigned to this part of the ship's battery. The two 19,000-ton battleships, Satsuma laid down in December, 1905, and Aki, laid down in March, 1906, both have 5-in. casemate armor, the same exactly as that provided for the North Dakota. It must be remembered that these ships were designed and their keels laid a considerable period after the Russo-Japanese war, and if the results of that war indicated that the 5-in. casemate armor was worse than useless or if their designers had considered that they could spare the weight for a greater thickness, it is extremely probable that it would have been entirely omitted or the weight increased, as Commander Key believes should have been done for the North Dakota. As regards the Russian deductions from the Russo-Japanese war, they have not since that time laid down any new battleships. The cruiser Rurik, recently completed at Vickers in England, has 3-in. casemate armor. The latest information obtainable as to the proposed Russian design for a 20,000-ton battleship shows a provision for 3.3-in. casemate armor. That Commander Key, in a purely theoretical discussion of the subject and without the actual data of battle which were available to the Russians and Japanese, was unable to convince the Newport conference of the superiority of his judgment to that of the designers of the North Dakota and the designers of the best representatives of foreign warship construction is not to be wondered at.

Torpedo Defense Battery Not Properly Placed.—The following is quoted from Commander Key's letter on this subject: "I am of the opinion that, instead of mounting them in the thin citadel, such guns would be much better protected and located if they were mounted in pairs in turrets of their

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own of 8-in. armor in positions as elevated as practicable on the upper deck without interfering with the after turrets firing 45 degrees forward of the beam and the forward turrets firing 45 degrees abaft the beam. Torpedo defense battery turrets might be placed in positions corresponding to the 9.2-in. turrets of the Lord Nelson."

The following resolution, expressing the views of the conference on this subject was passed by a vote of 43 to 7: "Resolved, That in view of the present knowledge concerning the construction and efficiency of turrets for torpedo defense guns, the conference does not consider it desirable to mount such guns in turrets on the North Dakota or vessels of her design." And the following resolution passed unanimously: "Referring to paragraph 2 of Commander Key's letter suggesting that torpedo defense guns be installed on the tops of the turrets of the most recent types of battleships: "Resolved, That this conference does not consider this disposition desirable, but the conference recommends that the general question of mounting torpedo defense guns be made the subject of special inquiry by the bureau of ordnance with the view of mounting them in higher and more commanding positions than is the case of the torpedo defense guns of the North Dakota, including the plans suggested by Commander Jayne and Commander Chase."

Twelve-Inch Guns Less Powerful Than Those of Foreign Nations.—The resolution quoted below was presented by Commander Key as expressing his views on this subject:

"Resolved, The main battery guns to be placed on board the North Dakota are inferior in power to guns now being built abroad for ships of about the same date of completion."

This resolution was not adopted by the conference, but the following was passed instead by practically a unanimous vote, there being only one opposing:

"Resolved, There is reason to believe that the main battery guns to be placed on board the North Dakota and Delaware are inferior in power to English guns now being built for ships of like date of completion and this inferiority should be corrected in the Florida and Utah. English 50 cal., 12-in. guns."

The following resolution bearing on the same subject was passed by a vote of 53 to 6:

"Resolved, There is reason to believe that the latest 12-in. guns afloat in the U. S. navy are equal to the latest 12-in. guns afloat in the English navy."

In this connection it appears from the record of the conference that the information upon which the criticism was based as to the power of foreign guns was not considered to be absolutely authentic. The resolutions of the conference would indicate that Commander Key's criticism on this point was partially sustained.

Location of No. 3 Turret Between the Engine Room and Boiler Room Undesirable and Unnecessary.—The resolutions of the conference on this point are shown as follows:

"Whereas, The magazine of No. 3 turret on the North Dakota is largely surrounded by sources of heat and a better location appears impracticable:

"Resolved, That we approve of provision for refrigeration of this magazine."

The above was passed by a vote of 39 to 21. At the time this vote was passed experiments were already under way with a view to providing refrigeration for all magazines on the North Dakota class. The following resolution bearing on the same subject was passed unanimously:

"Resolved, That upon the statement of naval constructors and of the bureau of construction and repair, the conference does not regard it as practicable to lengthen the North Dakota type by 25 ft. with an increase of displacement of only 300 tons and to locate the three after turrets as indicated in paragraph 4 of Commander Key's letter, echeloning them in the vertical plane."

After further consideration of the same subject the following resolution was adopted almost unanimously, only two votes being registered against it:

"Resolved, That from the information furnished this conference by the bureau of construction and repair and the naval constructors in attendance at this conference we believe it is impracticable to make the changes in design suggested by Commander Key in paragraph 4 of his letter within the limits as therein stated, but that we believe it is possible to make these changes without great increase in length and a great increase in displacement over that of the North Dakota as designed. The advocates of this change state that it would increase the tactical efficiency of the ship and remove the magazines of No. 3 turret from an undesirable location."

The conference in considering the subject of the arrangement of turrets for the design of the new battle ships Florida and Utah passed the following resolution by a vote of 41 to 9:

"The conference recommends that the present arrangement of turrets of the North Dakota be adhered to in the Florida and Utah."

From the above resolutions it will be seen clearly that Commander Key's criticism on the subject of the location of No. 3 turret guns was wholly unsustained by the conference.

It is interesting to note in this connection that the British Indomitable has her magazines for the waist 12-in. turrets between her boiler rooms, and that the three Brazilian battleships of the Minas Geraes class of the Dreadnought type, now building in England, and which have recently come into considerable notice in connection with their reported sale by the Brazilian government to Japan, have a 12-in. turret situated between the engine and boiler rooms in a position exactly similar to turret in the North Dakota, the position of which is criticised by Commander Key. It is clearly evident from this that the English designers of these Brazilian vessels have reached the same conclusion as to the location of this particular turret that was reached by the navy department officials when the design of the North Dakota was prepared.

Height of Armor Belt.—In addition to the views expressed by Commander Key in his letter of June 9, the following resolution introduced by him as expressing concretely his views on the subject is quoted:

"Resolved that the lower edge of the main waterline armor belt should be placed with reference to that waterline at which the ship is most likely to float when engaging in battle;

"That this most probable fighting waterline is that at which the ship would float with full supply of ammunition and two-thirds supply of stores and fuel on board;

"That the lower edge of the waterline belt should be placed 5 ft. below the above mentioned line;

"That for the foregoing reasons the lower edge of the waterline belt armor of the North Dakota is placed too low by about 20 in."

The conference did not adopt the resolution submitted by him but instead adopted the following resolutions by votes as given:

"Resolved, That the lower edge of the main waterline armor belt should be placed with reference to that waterline at which the ship is most likely to float when engaging in battle;

"That this most probable fighting waterline is that at which the ship would float with full supply of am-

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munition and two-thirds supply of stores and fuel on board."

This passed by a vote of 33 to 26, and the following resolution on the same subject was passed by a vote of 38 to 18:

"Resolved, That the lower edge of the waterline belt should be placed six feet below the most probable fighting draught as defined by this conference, and that the lower edge of the armor belt of the North Dakota, being within a few inches of that line, is substantially correctly placed."

It will be seen from the above that the conference did not agree with Commander Key that the lower edge of the main armor belt of the North Dakota was about 20 in. too low, but on the contrary stated that it agreed within a few inches of what they considered the proper location and was therefore substantially correctly placed.

Commanding Officers Not Supplied With Statements Showing Stability and Weight Conditions of Ships.—Commander Key made lengthy reference in his letter to the data and information of this kind supplied to English ships. Without examining into the matter carefully he made the sweeping criticism that such information was not supplied to the ships of the American navy. Had he examined into the blueprints and plans which are supplied to every ship when she goes into commission he would have discovered the data for which the navy department officials were criticised by him for not supplying. The Newport conference resolution covering this point is as follows:

"Resolved, That it is our understanding that the stability data mentioned in Commander Key's letter is now habitually supplied to ships. It is, however, the opinion of this conference that stability statement under different conditions of loading shall be accompanied by all other data convenient and necessary for service under sea conditions, such as having upper bunkers full and lower bunkers empty, taking deck loads of coal, etc."

This resolution was agreed to by every officer at the conference except Commander Key alone.

Ventilators and Funnels Too High and Not Properly Protected.—The conference resolutions on this point were agreed to without an opposing vote and are as follows:

"Resolved, That the ventilating pipes and cowls in the North Dakota and all subsequent designs should be shortened to the lowest practicable limit for the double purpose of removing unnecessary weight and obstacles that are likely to explode shell and cause splinters;

"Resolved, That the funnels of the North Dakota and ships of subsequent design should be shortened as much as practicable, having in view the necessities of fire control and the habitability of the bridges."

These two resolutions apparently sustained Commander Key's criticism, but if the wording is examined it will be seen that they are in both cases qualified by the words—in one case "lowest practicable" and in the other case "as much as practicable." The conference does not state what they consider the lowest practicable height in either case and the decision on that point is left with the navy department officials who are responsible for preparing designs. It is ridiculous to believe that they made these particular fittings any higher in the original design than what they considered was necessary for the purposes in view.

As regards the protection of the ventilators and uptakes by armor in addition to that already provided for in the design by the casemate armor the following resolution was passed without an opposing vote:

"Resolved, That the conference considers that splinter-proof armor should be placed around the uptakes and ventilator supply pipes within the citadel between the upper limit of 8-in. armor and the upper deck in the North Dakota to afford better protection to said uptakes and supply ventilator pipes."

This is practically the only change of any importance whatever which was recommended by the conference as a result of Commander Key's criticisms on the North Dakota. It may be noted that this change required increased displacement; that a great many improvements could be made to any ship if the designer is at liberty to increase displacement for each improvement.

General Results as Regards the North Dakota Design.—The following resolution proposed by Commander Key was agreed to without an opposing vote:

"Resolved, That the vote of the conference upon resolutions based upon separate characteristics of the design of the North Dakota are not to be considered in any way as adverse criticisms of the design of the North Dakota as a whole, as it is recognized that material sacrifices of weight and space had to be made in order to place five 2-gun 12-in. turrets on the middle line and to obtain a speed of 21 knots, which should give offensive 12-in. broadside fire to the North Dakota equal to any other battleship afloat or known to be designed at the present time."

The following resolution was passed by a vote of 44 to 12:

"It is the opinion of the conference that no change in the thickness of the armor of the North Dakota and Delaware can be made with advantage and that the distribution of the armor is in general satisfactory. The above in no way refers to the 5-in. casemate armor, which is the subject of other resolutions."

The following was passed by a vote of 33 to 20:

"Proposition.—Passing from the consideration of specific minor defects the conference believes that the design of the North Dakota and the Delaware is an excellent one."

It will be seen from these resolutions referring in general to the design of the North Dakota—one of which was introduced by Commander Key himself—that the design is considered to be a good one and that, so far as the conference is concerned, there is no foundation in fact upon which to build sensational reports that the result of the conference was that the designs were poor and that those responsible for them would be superseded in authority by some hand-picked board on design.—*Army and Navy Register.*

AROUND THE GREAT LAKES.

The steamer Buell which stranded on Southeast Shoal, Lake Erie, on the 15th, was released on Wednesday of this week by the tug Home Rule after 60,000 ft. of lumber had been lightered. The steamer had a line in her wheel, but she is not seriously damaged. The schooner Stewart which was in tow of the Buell is still aground. Her entire deck load of lumber will have to be lightered before her release can be effected.

The steamers James P. Walsh and Adriatic, downbound with ore, struck an obstruction in the channel at Bar Point, Detroit river, this week. The obstruction is believed to be the flukes of the anchor of the steamer Charles Weston which were lost on Nov. 13. The Weston was at that time engaged in releasing the stranded steamer William M. Mills, and the obstruction hit by the Walsh and Adriatic lies 1,000 ft. below the point where the Mills stranded. President William Livingstone of the Lake Carriers' Association has appealed to the United States engineer to sweep the Bar Point channel in order to avoid any further accident to passing vessels. The Adriatic, of the Lackawanna Steamship Co.'s fleet, was pretty badly damaged.

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After working on the steamer Peshtigo, ashore on Mackinaw Island, for 10 days, the tugs Reid and pontoons of the wrecking company's fleet have abandoned her and left for Sarnia.

The Cleveland & Buffalo Transit Co. has declared a quarterly dividend of 2¾ per cent, being the regular dividend of 1¼ per cent and an extra dividend of 1½ per cent. This makes a total of 8 per cent for the yar.

Bids for the improvement of the harbor at Michigan City, Ind., will be opened in the United States Engineer's office on Dec. 15. The improvements call for a widening of the harbor, tearing down old piers, and the construction of 900 ft. of new pile piers.

The new bulk freighter ordered last week from the American Ship Building Co. is for the La Belle Iron Works of Steubenville. The boat will be managed by M. A. Hanna & Co., Cleveland.

A meeting of the fleet engineers of the Lake Carriers' Association will be held at the Grand Pacific Hotel in Chicago today. F. B. Smith, fleet engineer for the Pittsburg Steamship Co., is chairman and it is expected that all the big fleets of the Lake Carriers' Association will be represented. New rulings made by the United States Supervising Inspectors of Steamboats in regard to weights of castings will be discussed.

Temporary lantern lights are being maintained on the outer pier-heads, entrance to Cleveland harbor, pending establishment of regular lights by the lighthouse department. These lanterns are likely to be extinguished during stormy weather, and navigators should exercise precautions accordingly and observe the regular harbor range lights in making the entrance.

The steamer City of Mackinac of the Detroit & Buffalo line will make the last trip of the season on Nov. 23, leaving Detroit for Buffalo.

Capt. Harry Ditzel will sail the new fire tug William A. McGonagle, recently launched at the Lorain yard of the American Ship Building Co. for the Duluth, Mesabi & Northern Railway Co. of Duluth. James Ditzel, a brother, will have charge of the engine room.

The steamer D. R. Hanna left the head of the lakes this week with a cargo of flax valued at $580,000. This, while not the largest cargo of flax carried on the lakes, is said to be the most valuable owing to the price now ruling for flax. The cargo consists of 400,000 bushels.

The sand sucker Paul Kruger, in tow of the tug Henry, was driven on the beach by the parting of the tow line while returning from the stranded steamer John C. Pringle last week. A big sea was running and the tug could not pick her up. The life saving crew went to the assistance of the crew of the Kruger.

The steamer William M. Mills of the Weston Transit Co.'s fleet, which stranded at Bar Point, Detroit river, on Nov. 12, owing to low water, is still aground. It is reported that the lighter Rescue has taken more than 1,100 tons of ore out of the stranded boat and is continuing with the work despite the heavy seas.

The schooner Mary Woolson, in tow of the steamer Charles H. Bradley, while coming down Lake Superior on Tuesday of this week broke away from the steamer and drifted out of sight. The Bradley put into Bayfield and notified the life saving station at Portage which set out in search of the schooner.

The steamer Portage, which has been under libel in the United States court for some time, was sold at public auction at Toledo on Tuesday of this week to George L. Craig for $7,560. More than $14,000 claims were filed against the Portage in the admiralty court, which the owners decided not to attempt to meet.

The Canadian steamer Neebing, loaded with grain, struck an obstruction and ran on the rocks just outside of Goderich Harbor, Lake Huron, on Tuesday of this week. The tug Ottawa of the Reid Wrecking Co. went to her assistance.

TO REGULATE LENGTH OF TOWS.

At the meeting of the board appointed under an act of Congress to make regulations governing the question of limiting the length of hawsers between towing vessels and seagoing barges, held in New York City on Nov. 9 and 10, maritime interests were given an opportunity of presenting their respective views on the subject. The board, which is composed of Rear Admiral Marix, chairman of the lighthouse board, George Uhler, supervising inspector general of the steamboat inspection service, and Eugene T. Chamberlain, U. S. commissioner of navigation, held session in the office of the Steamboat Inspection Service, New York Custom House, and was well attended by representatives of steamship lines, towing lines, sailing and ferry interests.

The trans-Atlantic steamship companies, represented by Allan Luckhurst, Emil Boas and Gustav Schwab, of the American and German lines, desire to have the length of tows limited and a set course assigned to barges and mud scows proceeding through the bay. It was pointed out that the navigation of the larger and faster liners was a matter of extreme difficulty under present conditions, according to reports of masters of this class of vessel.

The towing interests contend that, at the present rate of freight in the coast service, reducing the number of barges in tows (necessarily increasing the number of towing vessels), was financially impossible. Facts and figures were brought forth to show that prices had been cut down to from one-sixth to one-half previous rates, according to locality. During the discussion of the towing interests the matter of using the Coney Island channel was considered, it being pointed out, however, that the channel was not capable of accommodating the larger type of barge as it is at present, and that the work of improving the channel had been temporarily suspended. The towing interests also contended that the present speed of the fast steamers was not conducive to the welfare of extended tows, and especially fast steamers in harbor and river service, suggesting as a remedy the limiting of the speed of such craft within certain parts of the harbor. The towing interests were represented by Eugene F. Moran, Thomas J. Scully, Edgar F. Luckenbach and others.

The ferry boat interests, which were also well represented, are desirous of having a regulation framed whereby tows will be forced, where possible, to proceed up or down the river at a distance of 500 ft. from the ferry docks. It was argued that train ferries running to schedule were often delayed a matter of four or five minutes in leaving and arriving by tows passing close to the docks, disarranging the system and causing passengers to miss their train. Reducing the length of tows was also advocated.

While the board was in session the merits of the different customs followed by the towing companies were discussed at length, representatives of the marine department of the various railroad companies speaking on this point. In addition to owners and managers the board heard several masters of schooners, tow boats and steamships on the matter of the merits of their various craft. The discussion throughout was of considerable interest.

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THE PRODUCTION OF CHEAP POWER BY SUCTION GAS PLANTS.*

BY PHILIP W. ROBSON.

In the two years which have intervened since Prof. Dalby first described the suction gas producer before this association, the demand for such apparatus has shown a steady and continuous growth both in this country and abroad. It is safe to say that in the great majority of cases experience in the actual working of combinations of gas engines and suction producers has given the greatest satisfaction to the user, for they have proved to be both convenient and reliable as a means of deriving cheap power; and there are good reasons for believing that as the possibilities of the system become more fully understood its application will be increasingly extended.

It is interesting to note that though th idea of working producers on the suction principle was first worked out in France by M. Benier, and afterwards continued to a comparatively small extent in Germany, the real development of suction producers on a large commercial scale only took place when British engineers devoted themselves to their design and manufacture, and the extent to which trade in them has increased during the last four years is remarkable.

There are several reasons for this, the chief of which undoubtedly is that the modern gas engine and suction producer can, in fact, give power to small users and to large users for factory and electric driving more cheaply than it can possibly be obtained by other means. To illustrate this point I have selected three typical cases where the load demand and general requirements are widely different, and in each case the figures given represent average ascertained costs over at least a 12 months' period of working.

The significance of the above figures will be appreciated from the fact that, if in case A current was taken from a public supply at ½d. per unit, the total cost of same would be 4,708*l.* per annum. As the actual working costs with suction gas are 1,907*l.*, the difference between the latter and the cost of electricity at the assumed low rate of ½d. per unit represents a saving of 2,801*l.* in favor of the gas-power installation. This saving would entirely defray the initial total cost of the latter in a little over 18 months.

Nor can it be said that this economy has been obtained at the sacrifice of reliability, for, in the weaving shed referred to, the engine has been started up punctually every morning without fail, and the only stoppage in 12 months was that due on one occasion to a heated connecting rod brass. In the case of the cement works, rotary kilns are being operated, and the engines are regularly run for periods of from six weeks to two months night and day without stoppage. As I have said, these cases are typical.

It is also important to notice how the gas engine compares with its competitors, the electric motor and the steam engine, in the rate of breakdowns. Michael Longridge, in his last annual report, gives the following figures relative to engines and motors insured by his company:

RATES OF BREAKDOWNS.

Steam engines	1 in 8.1
Electric motors	1 in 8.2
Gas and oil engines	1 in 12.4

From which it would appear that, broadly speaking, gas and oil engines may be considered 50 per cent more reliable in actual practice than steam engines or electric motors. I refer here mainly to units up to 100 B. H. P. per cylinder.

We have been greatly aided in the successful development of these producers through having a suitable fuel at hand in England and Scotland and in several parts of Ireland. Up to the present, for reasons which will be explained later, suction producers have only been made to work on a commercial scale with non-bituminous fuels, such as anthracite and coke, both of which are easily obtainable in the industrial centers of the kingdom. In England, Welsh anthracite was obtainable until two years ago for about 20s. per ton, at which figure there was no difficulty in obtaining the much advertised "10 B. H. P. for one penny" in fuel cost. With the rise in the price of anthracite, gas plant makers adapted their apparatus to work with gas coke, which can be bought at from 10s. to 15s. per ton, and as the consumption of such coke in a well-designed producer need not exceed 25 per cent more than anthracite for the same power, it will be seen that it is in any case more economical to use it. It may be remarked incidentally that those responsible for gas works are grateful for this new market for their coke, which, during the summer months, at any rate, can in many towns only be disposed of with difficulty. In Scotland suitable anthracite can be obtained at from 10s. to 15s. per ton, and the local supplies of anthracite in most of our colonies and in France and Spain are now being successfully used for suction producers, while in other countries charcoal is plentiful and comparatively cheap. Speaking generally, therefore, the fuel problem both at home and abroad now presents little difficulty to those who have carefully studied the matter.

The principle of working all suction producers is similar; the gas inlet valve on the engine cylinder is directly connected to the producer, which usually consists of the furnace or generator coupled to a cooling vessel or scrubber. During the suction stroke of the cycle the inlet valve of the engine is opened, and the gas accumulated in the intervening pipes between the engine and the producer is drawn forward into the working cylinder together with a proper proportion of air. A corresponding amount of mixed air and steam flows into the furnace of the producer and reacts there with the fuel, with the result that gas is evolved of an amount equal in volume (after being cooled in the scrubber) to that drawn away. Hence the yield of gas entirely depends upon the suction effect exerted by the engine through the gas inlet valve; the latter being in turn under the auto-

ASCERTAINED TOTAL POWER COSTS WITH NATIONAL GAS ENGINE.

	Case A. Cement works.	Case B. Weaving shed.	Case C. Small factory.
Size of installation in B. H. P.	450	300	20
Average working load, B. H. P.	360	220	7.8
Total B. H. P. hours per annum	2,726,000	610,500	21,200
Initial total cost of installation (including foundations)	4,230*l.*	2,640*l.*	250*l.*
Total annual charges:—	£ s. d.	£ s. d.	£ s. d.
Interest and depreciation	423 0 0	264 0 0	25 0 0
Repairs and sundries	50 0 0	30 0 0	3 10 0
Fuel	1,298 4 8	135 4 2	15 11 0
Oil	135 3 10	10 0 0	2 0 0
Water (taken from canal in Cases A and B)	... .	... .	7 5 0
Attendance, etc.	423 17 4	135 0 0	12 10 0
Total	2,330 5 10	574 4 2	65 16 0
Total cost per B. H. P. hour	0.205d.	0.225d.	0.745d.
Equivalent cost per board of trade unit*	0.245d.	0.27d.	0.79d.

*This means that if current were delivered from a public supply to a motor of 90 per cent efficiency in Case C, the rate of charges for such current would have to be those stated to give the equivalent cost per B. H. P. hour also mentioned above. If, however, the standing charges in respect of the motors and electrical installation generally are added, this rate would have to be greatly reduced to equal the gas engine installation in economy.

*Paper read before Section G of the British Association at Dublin.

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matic control of the engine governor in the extent to which it is allowed to open causes the amount of gas to be automatically regulated to suit variations of load. All the attention that is necessary, therefore, while the plant is working is to keep the generator charged with fuel—an operation occupying from two to three minutes every two hours.

A typical combination of engine and producer is shown in Fig. 1, and it is easy to realize from the great simplicity of the combined arrangement

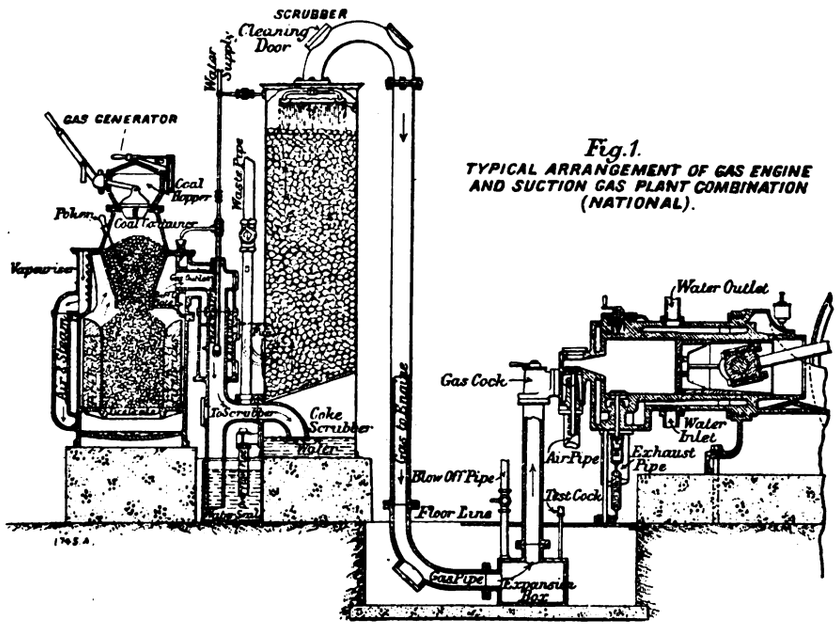

Fig. 1.
TYPICAL ARRANGEMENT OF GAS ENGINE AND SUCTION GAS PLANT COMBINATION (NATIONAL).

why, in correctly designed gas producers of this class, so large a measure of practical success has been attained. In such a producer as that illustrated the required steam is raised from the sensible heat of the gases after leaving the furnace on their way to the scrubber, and the air required for gasifying the fuel is partially saturated with this steam before it enters the furnace.

The conditions under which combustible gas is produced in the generator so as to give the best efficiency have been carefully investigated. Obviously, the fuel must be gasified in such a way as to lose a minimum quantity of heat in the producer, so that as large a balance as is possible is available for useful work in the engine. The only burnable gas which can be obtained in the usual way by the partial combustion of the carbon constituents of the fuel is carbon monoxide (CO), as expressed by the equation

$$2\ C + O_2 = 2\ CO \ldots\ldots (a)$$

but the production of this gas is attended by an evolution of 30 per cent of the heat of the carbon reacted on. Unless this heat were to a large extent recovered the efficiency of the producer would, obviously, be very low, and besides the cumulative effect of a continual liberation of heat in this degree would be to set up a very high temperature in the producer which would tend to the formation of excessive clinker and which would also cause many other difficulties.

A simple practical means of utilizing this heat and enriching the gas at the same time is by the method so generally adopted now of saturating or partially saturating the air passing to the furnace with steam. This steam reacts with incandescent carbon in two alternative ways:

$$C + 2\ H_2O = CO_2 + 2\ H_2 \ldots\ldots (b)$$
$$C + H_2O = CO + H_2 \ldots\ldots\ldots (c)$$

In both of these reactions a combustible gas results, and they both require heat to enable them to take place. This is supplied by the liberated heat just referred to, which results from the direct combination of the oxygen of the air with the carbon of the fuel to form carbon monoxide, and hence, broadly speaking, the degree in which the reduction of steam according to either of the foregoing equations can take place with advantage depends entirely on the amount of heat available from the production of monoxide in the primary reaction according to equation (*a*).

The decomposition of steam in the presence of heated carbon, however, begins at a comparatively low temperature (between 500° and 600° Cent.), and hence if too much system is used the fire becomes unduly cooled, which is undesirable for reasons which will be presently considered.

A further advantage which follows from the use of steam is the enrichment of the gas made, for the hydrogen evolved by the reaction (*b*) and the monoxide and hydrogen in reaction (*c*) are combustible gases produced apart from reactions with atmospheric oxygen, which in all cases carries with it four times its volume of nitrogen. This latter is a diluent in all producer gas, and passes through the furnace unchanged. Hence the use of steam simultaneously effects three useful and necessary functions in the producer: It prevents the working temperature of the furnace from becoming excessive, in so doing it absorbs that large proportion of heat liberated by the union of the carbon of the fuel with the oxygen of the air passing to the furnace; and, thirdly, by producing carbon monoxide and hydrogen direct, the proportion of combustibles in the gas yielded by the producer is largely increased in proportion to the amount of inert nitrogen drawn in along with the air.

By neglecting the radiation losses, and also the heat losses in the scrubbers, it is possible to make a simple calculation of the conditions under which the whole of the heat of the fuel can be accounted for in the gas produced, and such a calculation is useful in enabling us to understand more clearly how a suction producer actually works. Since there are alternative ways in which the steam may be split up, as given above in equation (*b*) and (*c*), it is convenient to consider separately the combination of reactions which these equations represent when taken together with the primary reaction $2\ C + O_2 = 2\ CO$.

It will be found that if we combine the latter equation with (*b*) in the following proportions the total heat of the carbon reacted on is accounted for in the gas produced:

$$\left.\begin{array}{l} 2\ C + O_2 = 2\ CO \\ 0.95\ C + 1.9\ H_2O = 0.95\ CO_2 + 1.9\ H_2 \end{array}\right\} (d)$$

The composition of the producer gas which will be formed by these combined reactions is as follows, and assuming that the relative weights in the equation are taken in pounds, and the volume of gas produced in cu. ft., the total volume of each constituent will be:

CO..	715	cu. ft., or	22.6 per cent by volume
CO_2..	339.6	cu. ft., or	10.725 per cent by volume
H....	679.25	cu. ft., or	21.45 per cent by volume
N....	1,430	cu. ft., or	45.2 per cent by volume
	3,163.8		100.00

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The calorific value of this gas will be 151.5 B. T. U. per cubic foot.
The weight of steam per pound of carbon ..... 0.965 lb.
Air required per pound of carbon 50.5 cu. ft.
Total volume of gas produced..3,163.875 cu. ft.

Similarly, by combining the primary reaction with that represented by equation (*c*) in the following proportion we account for all the heat in the carbon:

$$\left.\begin{array}{l} 2\ C + O_2 = 2\ CO \\ 1.18\ C + 1.18\ H_2O = 1.18\ CO + 1.18\ H_2 \end{array}\right\} (e)$$

The composition and volume of the gas produced will be as follows:

CO...1,136.8 cu. ft., or 38.06 per cent by volume
H..... 420.25 cu. ft., or 14.06 per cent by volume
N.....1,430 cu. ft., or 47.88 per cent by volume

2,987.0 100.00

The calorific value of the gas per cubic foot will be.....179 B. T. U.
The weight of steam per pound of carbon ..... 0.577 lb.
Air required per pound of carbon. 46.8 cu. ft.
Total volume of gas produced.....2,987 cu. ft.

In making the foregoing calculations it is assumed that the heat required for steam raising purposes is obtained from the fuel consumed in the generator, and hence in establishing a heat balance the amount of heat required to vaporize the water has been deducted from the left-hand side of the equation in both cases. The only apparent difference in the efficiency of these two systems, therefore, lies in the fact that in the first more steam is used than in the second. It will be noted that the gas produced in the latter case is considerably richer than in the former.

It is found, however, that there are further considerations which influence the efficiency of gas producers. At temperatures of 500 deg. Cent. and over, it is well known that carbon monoxide and steam, and also carbon monoxide and carbon dioxide, may react with each other, such reactions being reversible and depending upon temperature. These reversible reactions are usually written as follows:

$$CO_2 + H_2 \rightleftarrows CO + H_2O \quad . \quad . \quad . \quad (f)$$

$$C + CO_2 \rightleftarrows 2CO \quad . \quad . \quad . \quad . \quad (g)$$

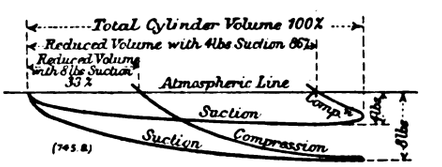
In both cases the reaction tends from right to left at temperatures under 800 deg. Cent., above which they take place in the opposite direction; in other words, the carbon monoxide tends to become destroyed in a certain degree as the temperature of the producer is lowered. Further, the combined reaction according to equation (*d*) also tends to take place rather than the alernative according to equation (*e*) as the temperature falls. It is obvious, therefore, that in order to get the highest working efficiency the steam supply should be regulated so that the temperature of the fire in the producer is kept as high as possible without making excessive clinker, seeing that a richer gas thereby results, and the reversible reactions tending to the destruction of carbon monoxide are avoided. Prof. Bone and Mr. Wheeler recently demonstrated the truth of this statement in an exhaustive series of experiments on a Mond producer. The fuel used contained 78 per cent of carbon, and by varying the amount of steam in the air-blast from 0.45 lb. to 1.55 lb. of steam per pound of coal gasified, the efficiency of the producer, including the steam for blowing engine, was found to fall from 77.8 to 66.5 per cent. Similar comparative results may be expected from a suction producer, and this drop of efficiency would appear to be due chiefly to the influence of the reversible reactions referred to. The efficiency of a good suction producer varies from 85 to 90 per cent, according to the conditions under which it is worked.

The importance of properly proportioning the steam supply will be appreciated; otherwise, the best results cannot be obtained, and this is one of the points to which further attention might with advantage be given by gas plant designers. Given a properly designed producer, however, the conditions of highest efficiency can be automaticaly and continuously obtained without the slightest trouble week in and week out whilst the plant is being worked by an ordinary attendant.

In all suction producers directly connected to the engine and automatically regulated thereby, successful working depends also upon the absence of any serious restriction to the flow of gas from the furnace to the engine cylinder. If there is a restriction for any reason, the weight of charge drawn into the working cylinder of the engine is reduced and a loss of power results which may make all the difference between success and failure. The effect of increasing the negative suction pressure on the volume of charge is shown in Fig. 2, from which it will be seen that by increasing the suction pressure from 4 lb. to 8 lb. the volume of the charge is reduced 53 per cent. The very simple form of generator and scrubber in the ordinary suction plant using non-bituminous fuel makes it possible to avoid undue restriction, even when gas coke or poor anthracite is used, each of which yields a certain amount of tarry matter, and consequently requires the addition of a suitable tar extractor to the scrubber shown in Fig. 1; the suction pressure can be kept sufficiently low to prevent the volume of charge becoming unduly diminished.

From these remarks it will be understood that simplicity in all directions is the essential condition for successfully working any producer by the suction effect of the engine, and this being so, the difficulty of treating bituminous fuels in the simple type producer shown in Fig. 1 will be appreciated. Bituminous fuels contain upwards of 30 per cent of volatile matter, which distils off at such temperatures as are found in the upper part of a suction producer; thus, if the coal container in Fig. 1 were charged with this fuel whilst the producer was at work, a considerable proportion of the volatiles would be distilled, and would pass away along with the gas made in the lower

Fig. 2.—SUCTION DIAGRAM FROM WORKING CYLINDER, SHOWING THE EFFECT OF INCREASE OF BACK PRESSURE.



part of the furnace before this fresh fuel reached the active zone of combustion. Now, of these volatiles, 6 per cent and upwards is tarry matter, which condenses out as the temperature of the gas is lowered in the scrubber and gas mains. These latter would quickly become clogged up, and, in addition, so large a proportion of tar would be carried forward to the engine that the successful working of the latter would be vitiated. It is this tar difficulty which is the chief trouble to be dealt with in making a successful suction producer to work with bituminous fuels, for the addition of extra cleaning apparatus to extract the tar in a sufficient degree would necessarily have the effect of greatly increasing frictional resistance to the passage of the gas from the generator to the engine, and would otherwise destroy that simplicity of arrangement which we have seen to be essential.

Attention has naturally been turned, therefore, to various methods by which the tar trouble can be eliminated, with the hope that it might prove possible to transform the condensable tarry vapors into fixed gases in the generator, so that the difficulty of tar extraction and additional cleansing apparatus generally could not arise at all. Attempts have been made to decompose the tar by working the producer on the down-draught principle, which has the effect

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of compelling the volatiles to pass through the hot zone of the furnace before leaving the producer. By another plan the gas outlet is in the middle of the producer, and air is supplied both at the top and at the bottom, the action which is aimed at being to use the upper half of the producer as a down-draught furnace for distilling and fixing the volatiles, while the lower half is supplied with the residual coked fuel, and works as an ordinary up-draught furnace. It is, however, extremely doubtful whether a successful solution of the difficulty will be arrived at by either of these two methods. In pressure producers many plans for reducing the tar within the producer by passing the volatiles through the hot zone of the furnace have been carefully tried from time to time, but without a sufficient measure of practical success to warrant the permanent adoption of any of them for use with bituminous steam coal such as is available here. There appears to be no reason for thinking that modifications of these proposals when applied to suction producers will prove to be more efficacious.

The calculations previously given in this paper would appear, however, to suggest a better method for attacking the problem. It has been shown that all the sensible heat liberated by the combustion of the carbon of the fuel with the oxygen of the air could be absorbed by the reduction of the steam passing into the furnace along with the air, and that the precise amount of steam which can be reduced depends entirely on the amount of heat which is si liberated. Further, when we account for the whole heat of the carbon in this way, and take into full consideration the diluent effect of the nitrogen which is unavoidably present, a gas of sufficient calorific value results for effective use in the engine cylinder.

There would, therefore, seem to be no reason why the furnace of the producer should not be devised in such a way that the volatiles are absolutely burnt out after being distilled, the heat of this combustion being afterwards recovered by the decomposition of steam under the conditions already described. The final heat balance would be exactly similar to that established by the combined equations already given, and in practice a gas of about 150 B. T. U. calorific value might reasonably be expected, and which is quite suitable for engine work. By such a method the tar would undoubtedly be eliminated, whilst the efficiency of the system would be high. There are several designers at work on producers of this character, and when the proper proportions and other practical details are understood a considerable measure of success may be hoped for; the simplicity of the cooling and scrubbing arrangements under this system gives good promise of the feasibility of evolving a practical suction plant for use with bituminous fuels. The ordinary plant, however, for gas coke or anthracite may still be expected to hold the field for units up to 100 brake horsepower.

The utilization of lower grade fuels, such as peat, for power purposes has a special interest for Ireland. Peat as a fuel yields a large percentage of volatile matter, and it will be realized from what I have just said that the design of gas plants for use with such fuels is in a transitional stage at the present time. Something is being done abroad with large pressure plants using peat and working with by-product recovery apparatus, and the practical results obtained with such installations will be watched with attention here. As these developments are progressing it seems to me that meanwhile those who are interested in the peat industry might with advantage give further attention to cheap methods of deriving it. Coal mining has become a highly specialized science and a thoroughly organized industry, but, from the point of view of similar organization and specialization, comparatively little has yet been done in the case of peat. Under such conditions there is small chance as a fairly cheap supply of coal is available. Whilst practice in producers suitable for peat tends to change so rapidly, and pending progress in cheap methods of deriving the peat itself, it may not, perhaps, prove to be altogether a disadvantage that larger power schemes depending on peat as fuel are postponed for a little while.

Reviewing the present position of suction plant combinations as a means of deriving cheap power, I think it is now generally admitted by those who have looked carefully into the matter that the claims made in respect of their convenience, economy, and reliability are well found. The fact that these results can be so easily obtained by an apparatus of such simplicity has a special significance at the present time, when the question of municipal and other public electricity supply undertakings is receiving so much attention from the point of view of the desirability or otherwise of supplying cheap power to manufacturers. It is becoming increasingly recognized by leading electrical engineers that it is exceedingly difficult, and in many cases impossible, to supply current for power purposes from central stations at rates sufficiently low to favorably compete with the cost to the consumer if he generates his own power, but as attention has recently been so fully drawn to this aspect of the matter in a comprehensive paper read before the Institution of Electrical Engineers by J. F. C. Snell, it is only necessary to briefly refer to it here. Mr. Snell has emphasized the present inability of most electricity undertakings to meet a large demand for power at sufficiently low rates to hold their own with users' own plants, and I understand his remedy to mean the remodeling of central power stations, the writing down of the capital expenditure already incurred in connection with them, and the elimination of independent electricity stations in the smaller towns in favor of a central installation supplying a group of towns.

I think Mr. Snell, who speaks with competent knowledge of electricity undertakings generally, does well to frankly face the position, but in view of such facts relative to the economy and reliability of gas power as I have ventured to refer to here, it will be conceded that there are adequate grounds for the serious doubts which some of us feel as to the wisdom of embarking on the many millions of expenditure which the general adoption of his proposals would entail. The ultimate effect of such proposals, which are chiefly framed with the object of supplying power to factories as distinguished from general electric lighting, would be nothing more than an attempt to do for the power-user what he can carry into effect on better terms for himself by the use of gas engines and suction gas producers.

Another important point is that the growing tendency which exists to remove factories out of the large town areas must tend to continually increase the distribution costs of electricity supply, thus making the chances of a margin of profit on any rate which it would be to the advantage of the user to accept even more remote. On the other hand, particular location has little or no influence on the successful and economical working of gas producers.

So far as the British Isles are concerned, all power must be derived from coal, which is almost our only source of energy at the present time. The fundamental problem, therefore, is to utilize the heat energy of the fuel as efficiently as possible at each point of application, and when power users, both small and large, have at their hand in suction gas plant installations a simple apparatus for so doing, which is practically as efficient as the largest central station plant, the latter is at a great disadvantage when heavy dis-

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tribution charges have to be added to the cost of power production at the station. With the foregoing important considerations underlying all problems of power supply from a central source, there would appear to be no pressing need for heavy expenditure on the part of public bodies in order to provide cheap power for manufacturers. I venture to suggest that these facts are of special importance in the case of our municipalities, which already have to meet such numerously heavy and greatly increasing monetary demands in connection with those objects and undertakings for which in any case they must accept responsibility.

PERSONALS.

W. J. Tretheway, vessel broker of Goderich, Ont., was in Cleveland last week.

Capt. Henry Cronkhite, of the steamer Japan, has been appointed master of the steamer Scranton for the balance of the season.

Hugh J. Roberts has been appointed dock agent for the Chicago & North Western railway at Escanaba vice W. F. Look, resigned.

Truman H. Newberry, of Detroit, has succeeded Victor H. Metcalf as secretary to the navy. Mr. Newberry has acted as secretary for some time past owing to Mr. Metcalf's illness.

C. H. Spotts, formerly manager of the paint department and Walter Ferris Swearer, assistant at the general office of the Joseph Dixon Crucible Co., Jersey City, are now associated with the Protectus Co., paint makers, the former as secretary and the latter as New York manager.

Capt. Charles J. Badger, superintendent of the United States naval academy at Annapolis, has been selected to command the new battleship North Dakota.

George T. Dawson, formerly president of the Dawson Ship Building Co., of Solomon's Island, Md., has been appointed superintendent of the yard of the Chesapeake Marine Railway Co.

At the last meeting of the Missouri Manufacturers' Association, J. A. J. Shultz, president of the Shultz Belting Co., and manufacturer of the well-known Shultz "Sable Rawhide" belting, and Shultz "Aqua" water-proof belting, and other leading lines, was elected president of the association. This is a Missouri State Association with headquarters in St. Louis.

Harry Pennington, Lumberman's National Bank building, Houston, Texas, announces that he has been appointed Texas agent for the Wheeler Condenser & Engineering Co., of Carteret, N. J., manufacturers of the well-known Wheeler surface, jet and barometric condensers, and Wheeler centrifugal pumps, Wheeler-Barnard water cooling towers, Wheeler-Edwards patent air pumps and other lines manufactured by this company, such as feed water heaters, vacuum pans, multiple effects, exhaust relief valves, etc. Mr. Pennington has been engaged in the practice of mechanical engineering in Houston for a number of years, and has been identified with many of the large enterprises in that section, having had charge during the past seven years of engineering construction work, costing over $2,500,000. He is at present consulting engineer for the Galveston water works, engineer for Houston and Fort Bend counties, president of the Southwestern Engineers' and Architects' clubs and chief engineer officer of the state of Texas.

OBITUARY.

Capt. George Bartley, veteran lake captain, died at his home at Ford river at the age of 73 years last week.

Mrs. Annie Allen Baker, the wife of Howard H. Baker, of Buffalo, died at the home of her daughter, Mrs. Howard M. Cushman, at East Aurora last week.

Willard S. Mott, second officer of the Pacific Mail liner, Mongolia, was accidentally killed on board the vessel in Hongkong harbor Tuesday, Sept. 29. Mr. Mott was a former resident of San Diego, Cal., where he was well known. He was married last June to Miss Winifred Coy of Santa Barbara, and this was his first voyage since his marriage.

Capt. Thomas Mulvehill, a pioneer pilot and river captain, died at his home in Pittsburg last week from a stroke of paralysis. In his early days he was a member of the firm of W. H. Brown & Co., operating a fleet of vessels on the river. He later formed the firm of Mulvehill, Gumpert & Huey, but retired about 20 years ago.

Perry White, one of the pioneer ship builders, died at Ashtabula this week at the age of 82. The first boat he built was constructed at Cherry Valley and taken overland to the Mississippi. He later built the schooners Valentine, Conneaut and Capron. He also built the schooner Venture and sailed her himself for a few years. He built the tugs Kittie Downs and the Wm. D. for J. G. Laird, of Ashtabula.

Aaron A. Parker, president of the White Star Line and senior member of the firm of Parker Bros. Co., died at his home in Detroit on Nov. 13 of valvular heart trouble from which he had suffered several years. Mr. Parker was born in Hamburg, N. Y., but came to the great lakes in his early manhood. He first engaged in the lumber business, but later entered the vessel and coal and coke industries. He established the White Star Line, which is one of the leading day lines on the lakes. He is survived by a widow and two brothers, Byron W. and Harry B. Parker.

Capt. Robert Sudden, the well-known Pacific coast ship owner, died suddenly at his home in San Francisco, Sept. 3, at the age of 80 years. Capt. Sudden was a native of Scotland and came around the Horn to San Francisco in 1850 in command of a fishing schooner. After continuing in that trade for some time he later became master and then owner of steamers. He was the originator of the present Pacific Coast Steamship Co. and has been interested in great numbers of shipping enterprises. He retired from active business life several years ago.

Capt. J. G. Parker, one of the oldest navigators on Puget Sound, died at St. Peter's hospital, Olympia, Wash., Oct. 2. Capt. Parker was born in Kingston, Canada, in 1829, and was the son of a steamboat owner and master. In 1855 he built the little steamer Traveller, 60 ft. long, and brought her in sections to Puget Sound where she was for many years the only steamboat on the Sound. Later Capt. Parker was purser, pilot or master on the steamers Ailda, Isabel, Daisy, North Pacific and Messenger. These are all pioneer boats and the North Pacific and Messenger are particularly famous for the part they have played in the development of steam navigation on the north Pacific coast. In 1887, Capt. Parker sold out his steamboat interests to his two sons and since that time has lived a quiet life at his home in Olympia.

BIDS FOR REMOVING WRECK.

Bids for removing wreck of the steamer Gulf Stream, lying sunk at the entrance to Hereford Inlet, New Jersey, opened at the U. S. engineer office at Wilmington, Del., by Capt. L. H. Rand, were as follows:

Merritt & Chapman Derrick & Wrecking Co., 17 Battery Place, New York, N. Y.	$9,860
Van Sant & Gandy, Atlantic City, N. J.	4,682
Napoleon B. Register, Lewes, Del.	3,813
*Eugene Boehm, Atlantic City, N. J.	1,512
Johnston & Virden, Lewes, Del.	1,540
Frank B. Jones, Wilmington, Del.	4,400
Jesse A. Gray, Philadelphia, Pa.	1,950

*Accepted.

BOILER CONTRACTS AWARDED.

The contracts for furnishing six marine boilers for shipment to the Philippines under bids recently opened by the depot quartermaster at New York, are as follows.

Vermilye & Power, 50 Church St., New York, N. Y., two boilers at $469 each.

New Jersey Foundry & Machine Co., New York, N. Y., six boilers at $435 each.

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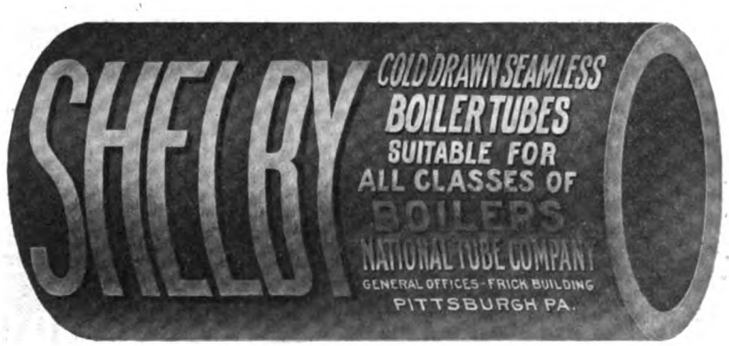

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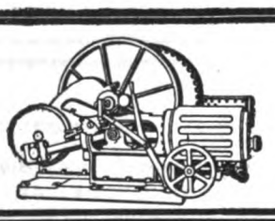
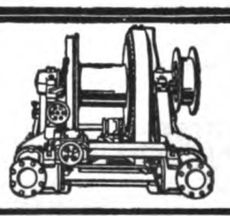
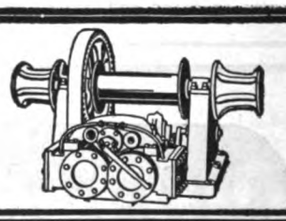

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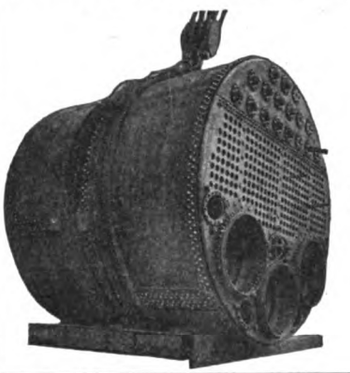

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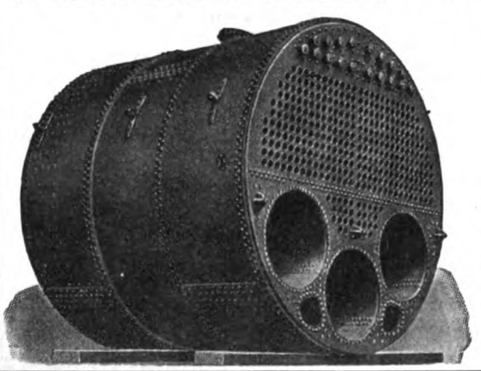

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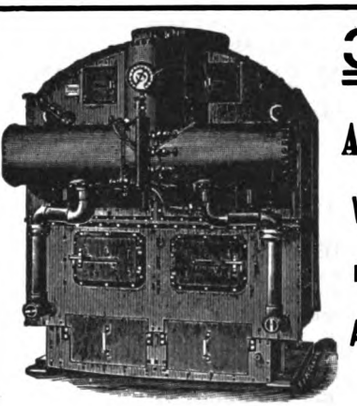

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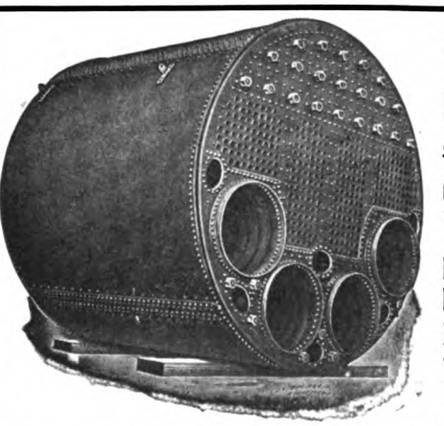

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